THE VETERINARY BULLETIN

1932.

VOLUME II

WEYBRIDGE:
IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

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IMPERIAL BUREAU OF ANIMAL HEALTH.

THE

VETERINARY BULLETIN

Vol. 2.] **January, 1932.** [No. 1.

DISEASES CAUSED BY BACTERIA AND FUNGI.

WILLIAMS, H. (1931.) **Some Observations on Tuberculosis in the Hebrides, with special reference to Milk.**—*Edinburgh Med. J.* **38.** 209-218. 4 charts. [3 refs.]

This paper is of some veterinary interest because the author, in investigating the epidemiology of tuberculosis among the inhabitants of the Outer Hebrides, examined 252 samples of cow's milk for the presence of tubercle bacilli, both by cultural and by biological methods. The samples were collected at random from the various islands in the group and in no case were tubercle bacilli found.

Human tuberculosis in the Hebrides is considered to originate from human sources. The author says that various inquirers have found that tuberculosis is very rare among cattle in all the islands of Northern Scotland.

J. T. E.

BOES, M. J. (1931). Vaccination Antituberculeuse par le BCG. État Actuel de la Question. **[The Present Position regarding Vaccination against Tuberculosis by means of BCG].**—*Ann. Méd. vét.* **76.** 241-269.

This is a verbatim reprint from *Bull. Off. internat. Epiz.* (1931). **5.** 25-62, 217-223 & 254 [see this *Bulletin.* **1.** 266].

W. A. P.

BUSCHMANN, H. (1931). Nouvelle contribution a l'étude du vaccin BCG. **[A fresh Contribution to the Study of BCG Vaccine].**—*Ann. Inst. Pasteur.* **47.** 374-385.

The author describes a number of experiments carried out to determine the possibility of variation occurring in the virulence of BCG cultures ; he also gives details of a further series in which he investigated the tuberculin reaction obtained after protective inoculation.

Virulent tubercle bacilli, inoculated into guinea pigs affected with rickets as the result of being fed on a special diet, proved rapidly fatal, but no modification in virulence was observed when BCG was injected in similar circumstances.

Subcultivation of BCG on special media (designed to bring about R-S variation) and passage inoculations did not affect the pathogenicity of the strain.

From the results obtained in 203 children, the author concludes that the present method of vaccination is harmless to the new-born or young child; vaccination by the oral and subcutaneous routes effected a reduction in the incidence of tuberculosis in the treated children as compared with untreated controls.

In testing the allergic reaction provoked by BCG, it is essential to employ BCG tuberculin ; a considerable difference was found in the number of reactors obtained, both in inoculated guinea pigs and in vaccinated children, if ordinary tuberculin was used instead of BCG tuberculin. Ten per cent. more tuberculin reactions were obtained in those given subcutaneous inoculations than in those which received the vaccine *per os* and, on an average, over 30 per cent. more patients reacted when BCG tuberculin was employed.

NORMAN HOLE.

KELLY, R. B. (1931). **The Infection of Virgin Stock by the Abortion Bacillus.** —*Austral. Vet. J.* **7.** 31-33.

The author records infection with *Br. abortus* in two heifers, aged 14 and 16 months respectively, out of a group of 53 cattle. A second test of the same group of young cattle carried out two months later revealed another reactor. The adult stock on the farm were known to be infected with abortion. The author discusses the possibility of udder infection in unbred heifers.

T. M. DOYLE.

BONNIKSON, H. P. (1931). **Progress in Bang's Disease Control.**—*Monthly Bull. Dept. Agric. California.* **20.** 515-518.

A plan for the eradication of bovine contagious abortion was adopted in California about two years ago and, being an innovation, it was made rather flexible so that cattle owners would support it. It is based on diagnosis by the agglutination test and on the removal of reactors. Farmers are allowed the choice of immediate disposal or isolation of reactors or of segregation of calves to found a new clean herd. The laboratory testing is done free, but the owners must employ a veterinary surgeon to take the samples and supervise the work generally. The Division of Animal Industry supervises the plan and issues certificates for " Bang Disease Free Herds " to those which have been found free from infection for a period covered by three half-yearly tests. They are valid for one year only. Ninety herds are now included in the plan of which details are given in this article.

J. T. E.

HOWARTH, J., & HAYES, F. M. (1931). **Brucelliasis in the Swine Herd of the University of California.**—*J. Amer. Vet. Med. Ass.* **78.** 830-848. 7 tables. 3 figs. [3 refs.]

The authors investigated the blood agglutination titres of a herd of swine affected with Brucelliasis. The porcine strain of *Br. abortus* was isolated from the chorion and from the stomach contents of aborted fœtuses.

An agglutination titre higher than 1 : 50 was accepted as indicating infection ; an animal with a titre between 1 : 25 and 1 : 50 was retested.

Sows showing a high blood titre may give birth to apparently healthy litters. The titres showed a tendency to decline at the time of farrowing, but usually rose again to their previous high level. The reaction of pigs at birth, and before they obtained colostrum, was negative.

Forty-three young pigs, the progeny of reacting sows, were kept in contact with infected animals and, during the first three months after weaning, all gave negative reactions to the agglutination test ; then one animal reacted positively, another gave an indefinite reaction and five reacted in a dilution of 1 : 25.

A comparison between the breeding records of positively and negatively reacting sows showed that, in the former, the " average percentage litter " was 6·48 live pigs and 2·64 dead pigs ; in the latter, the " percentage litter " was 6·54 live pigs and 2·21 dead pigs.

T. M. DOYLE.

THOMSEN, Axel. (1931). L'avortement épizootique à Brucella chez les porcs au Danemark. [**Epizootic Brucella Abortion of Pigs in Denmark**].—*Rev. gén. Méd. vét.* **40.** 457-466. 2 figs. [4 refs.]

Although this disease is serious in North America from the economic point of view, it is rare in all the European countries except Hungary. An outbreak is described amongst swine in Denmark in which more than 150 herds were involved. With the exception of ten cases, all the epizootics were traceable to two herds, but the origin remains unknown. The description is supported by a map and diagram.

Apart from the distribution of sows as the result of numerous private sales, the disease was spread to a large extent by boars for which the organism appears to be particularly pathogenic. In one case, a stud boar, after having served an infected sow, transmitted the disease to 19 out of 33 herds from each of which he had served a number of sows. This boar gave a positive serological reaction and *Br. abortus* was isolated from its seminal vesicles. The boar usually proves to be a reactor when a serological examination of an infected herd is carried out. Such affected animals are often very bad sires ; they still transmit the disease, but the infectivity of individuals fluctuates. Ingestion is considered to be the commonest method of infection in the boar.

Out of 11 reacting boars, *Br. abortus* was obtained in six cases from the seminal vesicles and in one case each from the epididymus, prostate and bulbo-urethral gland. Of 22 strains examined, all gave a good growth on anaërobic media after three days, but as compared with the bovine strain there is a difference in the oxygen requirements and in the inhibitory power of certain dyes.

Brucella infection in pigs is a new disease in Denmark; it has nothing in common with bovine abortion and reciprocal infection has not taken place although there has been every opportunity. An agglutination reaction of 1 : 50 is taken as evidence of infection for diagnostic purposes, but this titre may only be manifest for a few days after abortion in the sow. Emphasis is laid on the fact that, although there may be a higher percentage of reactors than in cases of the bovine disease, the percentage of abortions is lower.

The author concludes by describing certain measures of control which have met with considerable success since they have been put into force. The disease has not been completely stamped out in all parts of the country, however, and prophylaxis is proving more difficult than was at first expected.

N. BARRON.

SCHAFFER, J. M., MACDONALD, A. D., HALL, Walter J., & BUNYEA, Hubert. (1931). **A Stained Antigen for the Rapid Whole Blood Test for Pullorum Disease.**—*J. Amer. Vet. Med. Ass.* **79.** 236-240. [2 refs.]

COBURN, D. R., & STAFSETH, H. J. (1931). **A Field Test for Pullorum Disease.** —*Ibid.* **79.** 241-243. 1 table. [2 refs.]

There were found to be certain disadvantages in the antigen originally recommended by BUNYEA, HALL and DORSET for the rapid whole blood test for pullorum disease. In preparing the antigen, the present authors add a one per cent. solution of crystal violet in such proportion that the final product contains 3 c.c. of the crystal-violet solution in each 100 c.c.

The staining of the suspension was found to be an advantage as it made possible the reading of the tests against a white background which greatly facilitated interpretation.

Coburn and Stafseth have also modified the antigen, by adding a mixture of gentian violet and brilliant-green. One c.c. of a concentrated alcoholic solution of gentian violet and 5 c.c. of a 1 : 1,000 solution of brilliant-green were added to each 100 c.c. of the suspension.

T. M. DOYLE.

COOPER, H., & NAIK, R. N. (1931). **The Existence of Fowl Typhoid in India.** —*Ind. J. Vet. Sci. & Anim. Husb.* **1.** 99-100. 5 tables.

The authors describe an outbreak of fowl typhoid in the United Provinces which would appear to be the first reported outbreak of the disease in India.

A vaccine, prepared by heating a carbolised saline suspension of *S. gallinarum* for one hour at 65° C., failed to protect fowls against a small dose of live culture. [In this country, farmolised vaccines are fairly extensively used against the disease with moderately good results.]

T. M. DOYLE.

SCOTT, W. M. (1930). **Food Poisoning due to Eggs.**—*Brit. Med. J.* July 12th. 56-58. [1 ref.]

In a number of cases of food poisoning due to *B. ærtrycke*, there was strong circumstantial evidence that ducks' eggs were the source of infection. The author suggests that egg infection may be responsible for many of the mysterious cases where only one is attacked out of a number of persons apparently partaking of the same food. He discusses three possible methods by which eggs may become infected :—

LECOCQ suggested the possibility of germs being mechanically introduced by the male bird at *coitus*.

The infection of chickens' eggs with *B. pullorum* is known and, although this germ is not a recognised pathogen for man, *B. anatum* in the duck (allied to *B. ærtrycke*) may possibly be similarly transmitted. [The author also quotes *B. sanguinarum* as an example of an egg-transmitted bacterium, but this has yet definitely to be proved.]

The third method suggested is infection through the shell after the egg has been laid ; experimentally, the author has found this possible and he considers that ducks' eggs are the chief vectors, possibly because they may be laid in ditches and dirty water.

NORMAN HOLE.

VERGE, Jean. (1931). Les paratyphoses des renards argentés. [**Paratyphoid Infections of Silver Foxes**].—*Rev. gén. Méd. vét.* **40.** 335-341. 2 tables. [8 refs.]

The review of recent literature which constitutes the first part of the article, together with the author's own observations, indicates that a disease entity characterised by anorexia, weakness, conjunctivitis, nasal discharge, varying degrees of jaundice, hypertrophy of the spleen and enteritis, occurs in young silver foxes. Bacteria of the paratyphoid group have been incriminated from time to time.

The author isolated bacteria of the paratyphoid B group in four out of five cases from two distinct outbreaks. Agglutination tests indicated that two of the strains fell into the *B. ærtrycke* group. A formolised vaccine prepared from these strains dramatically ended a natural outbreak. Attempts to trace the origin of the infection failed.

[Some doubt exists as to whether a disease analogous to canine distemper occurs in silver foxes. The above article probably deals with a condition which is often regarded as distemper by fox farmers.]

R. S. ROBERTS.

CASSAMAGNAGHI, A. (1931). Le diagnostic de la lympho-adénite caséeuse des moutons par l'intradermo-réaction à la Preisznocardine. [**The Diagnosis of Caseous Lymphadenitis in Sheep by the Intradermal Reaction to Preisznocardine**].—*Bull. Acad. vét. de France.* **4.** 329-333. [1 ref.]

Preisznocardine is the name given by CÉSARI to a filtrate of 2-4 week old cultures of the Preisz-Nocard bacillus. Using experimentally infected guinea pigs, he demonstrated the value of this filtrate as a diagnostic agent when used on parallel lines to intradermal tuberculin.

The present author has gone further and has shown the value of this agent in the diagnosis of caseous lymphadenitis in naturally and in experimentally infected sheep in Montevideo. He obtained 100 per cent. positive results by injecting the filtrate into the caudal fold and reading the results at the 24th hour.

NORMAN HOLE.

KAMEL, SALIB, & BARKER, J. (1931). **Gloss-anthrax in Cattle.**—*Vet. Rec.* **11.** 853.

The authors report a case of "gloss-anthrax" in a calf aged four months. The tip of the tongue which protruded from the mouth was cold and the frenum, dorsum and sides were deeply congested; the mucous membrane was easily removed revealing a dark hæmorrhagic surface. There was a swelling in the submaxillary space and the temperature was 100·6° F. a few hours before death.

Autopsy [presumably carried out on the day following death] showed a gelatinous hæmorrhagic infiltration of the tongue and submaxillary region and several small pneumonic foci in the lungs.

Microscopical examination of the spleen revealed "bipolar bacilli identical with hæmorrhagic septicæmia organisms."

Two of the authors, Kamel and Salib, were apparently satisfied that the calf died of hæmorrhagic septicæmia.

[The isolation of bipolar staining bacteria from a dead animal does not by

itself justify a diagnosis of hæmorrhagic septicæmia. The pathogenicity of the strain isolated must also be established.]

T. M. DOYLE.

DUPONT, M. C. (1931). Etudes bacteriologiques sur le lait. Microflore mammaire anormale. [**Bacteriological Studies of Milk. Abnormal Flora of the Udder**].—*Le Lait.* **11.** 29-35. 2 tables. [1 ref.]

Yellow, white and intermediate forms of staphylococci predominate in normal milk, constituting more than 90 per cent. of the total bacterial count. Of the cultures studied, forty per cent. acidified and coagulated milk and 50 per cent. liquefied gelatin.

An interesting case was investigated at a farm on which, in spite of good hygienic conditions, the milk kept badly. The trouble was proved to be due to the invasion of the milk by two distinct types of bacilli which had very pronounced acidifying and proteolytic properties and which were tracked down to one particular cow. This cow had just survived a difficult parturition and the lowered condition of the animal had apparently so affected its milk that it became susceptible to the bacterial invasion. After the exclusion of this milk from that of the remainder of the herd, the trouble ceased.

NORMAN HOLE.

ROSHER, A. (1931). **The Effect of the X and V Growth-factors on the Pathogenicity of Indole-producing Strains of Influenza Bacilli.**—*Brit. J. Exp. Path.* **12.** 133-136. [4 refs.]

The literature upon the pathogenic action of *B. influenzæ* has recently been reviewed by W. M. SCOTT [*A System of Bacteriology.* **2.** 345. *H.M. Stat. Off.*] and the author quotes the statement that " the influenza bacillus in pure cultures cannot be made to infect experimental animals."

Pathogenic effects with surface cultures have, however, been recorded and in the present work a number of strains were tested on mice, paying particular attention to the relation between indole production and pathogenicity, and to the effect of reinforcing the injection of influenza bacilli with a small quantity of the x and v growth factors. [For note on these factors see abstract of KOLLATH's paper, this *Bulletin.* **1.** 237.] Working with mice in groups of 25 and 100, injecting bacterial suspensions of indole-producing and non-indole-producing strains of *B. influenzæ* intraperitoneally, and using 0·05 c.c. of Fildes' solution [FILDES, P. (1920). *Brit. J. Exp. Path.* **1.** 129.] to supply small quantities of x and v factors along with the organisms and so give them a good start in their new surroundings, the authors claim :—

(1) That the pathogenic action of an organism which does not produce any notable quantity of toxin *in vitro* can be disclosed more readily by introducing its necessary growth factors along with it. The healthy peritoneal cavity does not contain the necessary factors, but if these are supplied either by injury to the surrounding tissues or by including them in the inoculum, growth can take place and toxic substances be produced under conditions more favourable to their preservation than in a test-tube.

(2) That the inclusion of x and v in the inoculum definitely increases the virulence of influenza bacilli for mice and accentuates the difference in pathogenicity between strains which produce indole and strains which do not.

(3) That the majority (71 per cent.) of indole-producing strains are pathogenic to mice whereas those which produce no indole are practically non-pathogenic.

In regard to pathogenesis, symptoms did not appear until five or six hours after injection, and death occurred in 16 to 36 hours. *Post-mortem* examination showed enlargement of the spleen and enlargement of the glands in the axilla and groin, with considerable congestion of the blood-vessels of the abdominal and thoracic walls. Influenza bacilli were generally present in films and cultures from heart blood, spleen and glands.

H. H. GREEN.

ROBERTSON, Madge E. (1931). **A Note on the Cause of Certain Red Colourations on Salted Hides and a Comparison of the Growth and Survival of Halophilic or Salt-loving Organisms and some Ordinary Organisms of Dirt and Putrefaction on Media of Varying Salt Concentrations.**—*J. Hyg.* **31.** 84-95. 12 figs. 1 table. [17 refs.]

Skins cured with marine salts are likely to develop large areas of brick-red colouration which are found to be due to the growth of organisms derived from the salt. There are many varieties of the organisms and they have the common characteristics of flourishing in high concentrations of salt, growth stopping when the concentration falls below six per cent.

Cocci and bacilli isolated from dirt and putrid materials survived for a considerable time in salt concentrations up to 30 per cent., but no growth occurred when the concentration exceeded six per cent. The cocci survived for a longer period than the bacilli and this supports the view expressed by a number of workers that variations of salt concentration might assist in isolating organisms from mixtures.

A. LESLIE SHEATHER.

SORDELLI, A., PRADO, M., & FERRARI, J. (1930). Sobre la "Hemoglobinuria de los bovinos." Complejidad de la flora anaërobia de la lesion hepatica. [**Bovine Hæmoglobinuria. The Complexity of the Anaërobic Bacterial Flora of the Hepatic Lesion**].—*Revist. Inst. Bact., Buenos Aires.* **5.** 845-853. 2 tables, 2 plates. [3 refs.]

The authors describe the morphological and cultural characters of sporulating anaërobes recovered from the necrotic hepatic lesions in cases of bovine hæmoglobinuria. The original must be consulted for the details.

A. LESLIE SHEATHER.

DHAYAGUDE, R. (1931). Y a-t-il une électivité cutanée des teignes animales? [**Have the Animal Ringworms a Cutaneous Electivity?**].—*Ann. Parasitol.* **9.** 368-371. [1 ref.]

BROCQ-ROUSSEAU, URBAIN and BAROTTE have produced ringworm lesions on scarified areas of the skin of guinea pigs by administering the fungi by the intravenous, intraperitoneal, subcutaneous or alimentary routes a short time prior to the scarification.

Using *Trychophyton gypseum asteroides* and *Microsporum felineum*, the author has repeated their experiments employing the subcutaneous and intraperitoneal

routes only (to obviate the possibility of mechanical transmission by the intravenous route and fæcal contamination from administration *per os*). In two series of experiments, he failed to obtain any positive results or to produce any immunity to normal cutaneous infection.

He concludes that dermatophytes are pathogenic only for the skin tissues.

NORMAN HOLE.

PARISH, H. J., & CRADDOCK, S. (1931). **A Ringworm Epizootic in Mice.**—*Brit. J. Exp. Path.* **12.** 209-212. [3 refs.]

The authors say that there are few records of true ringworm epizootics in mice [favus is fairly common]; they describe a sudden outbreak involving nearly 50 per cent. of a stock of 2,500 mice in the course of which four laboratory attendants became infected. The causal fungus was identified as *Trychophyton gypseum asteroides* and the outbreak appeared to be due either to a flare-up of latent infection following some predisposing factor, such as skin irritation, or to the introduction of a virulent virus from an outside source.

NORMAN HOLE.

DISEASES CAUSED BY PROTOZOAN PARASITES.

HOFKAMP, H. S. (1931). Een vergelijkende Studie van het hœnder- en duivencoccidium. [**A comparative Study of the Coccidia of Poultry and Pigeons**]. —*Tijdschr. Diergeneesk.* **56.** 867-878. 3 plates. 1 table.

This paper contains an account of the author's cross-infection experiments with the coccidium of poultry (*E. tenella*) and the coccidium of the pigeon (*E. pfeifferi*). The experimental birds were first tested for the presence of infection and comparative tests were carried out with the Nöller and Otten, the sugar flotation and the Lane direct centrifugal flotation methods. The last of these was found to be from 10 to 20 times as efficient as the others.

Out of 11 chickens, four were successfully infected with *E. pfeifferi* and further fowls were infected with oöcysts from the fæces of these chickens. After one passage through the fowl, the coccidium of the pigeon appeared to be as virulent for the fowl as that derived primarily from fowls. Similarly, four attempts to infect pigeons with *E. tenella* all succeeded, although the infection produced was a mild one. It does not appear from the records that this experiment was carried to the stage of infecting further pigeons.

Measurements of oöcysts from infected fowls and pigeons indicated that there was a slight difference in size. It is specifically stated that the average length and breadth of the fowl parasite was calculated from the measurement of 2,000 individuals. No details of this nature are given regarding the pigeon parasite.

It is said that the oöcysts of the pigeon parasite acquire the same measurements as those of the fowl parasite after passage through the fowl. The author draws the conclusion that the two are identical.

Various disinfectants were tested on the fæces, and the author concludes that a ten per cent. solution of caporit is the best agent. Ten per cent. soda and ten per cent. antiformin are said to be "useless." No information is given regarding either the length of exposure or the temperature. Caporit in 0·1 to 1·0 per cent. dilution is said to exercise a favourable action upon sporulation. Some

therapeutic experiments were carried out with creolin, tricresol, spirocid, rivanolette, igitol and ichthargan. Satisfactory results were obtained with ichthargan. The dose was 0·3 g. per kg. No details of these experiments are given.

A. LESLIE SHEATHER.

GIERKE, A. G. (1931). **Anaplasmosis in Cattle.**—*Monthly Bull. Dept. Agric. California. August.* pp. 519-521.

The author gives a brief account of anaplasmosis as it occurs in the United States. It is known in California and in seven other States.

J. T. E.

MANSON-BAHR, P. (1931). **The Epidemiology of Human Trypanosomiasis at the Present Time.**—*Proc. Roy. Soc. Med.* **24.** 837-845.

Trypanosomiasis in Africa is intimately associated with tse-tse flies and, wherever flies of the genus *Glossina* occur, trypanosomiasis of man or animals or of both is encountered.

Two forms of human trypanosomiasis, which are transmitted by different vectors, are known in Africa:—*T. gambiense*, transmitted by *G. palpalis*, and *T. rhodesiense* by *G. morsitans*. While these parasites cannot be distinguished from each other as they occur in the blood of patients, there are certain factors concerning the clinical conditions which they cause, their insect vectors, distribution, etc., which serve to distinguish them.

The tse-tse flies differ from other biting flies in that they do not lay eggs. Larvæ are deposited singly at intervals of about a fortnight and pupation occurs at once. Perfect insects emerge in from one to two months.

G. palpalis is more restricted in its haunts than *G. morsitans*, but, while the former will suck blood from mammals, birds and reptiles, *G. morsitans* appears to restrict its attacks to man and game.

The author gives the limits of distribution of the two types and points out that the distribution of the two forms of human sleeping sickness correspond with the areas defined by these limits. It is less easy to define the distribution of *T. rhodesiense* because the most striking clinical symptoms can best be seen in Europeans and because laboratory facilities are essential for the specific recognition of the parasite. It would appear, however, that the distribution of this parasite is more patchy and haphazard than that of *T. gambiense*. A complication is introduced by the occurrence of outbreaks caused apparently by *T. rhodesiense* and transmitted directly from man to man by *G. swynnertoni*.

The author gives a survey of the clinical characters of the two diseases, emphasising the more dramatic character of those produced by *T. rhodesiense*.

Treatment with Bayer 205 is effective in the case of *T. rhodesiense* infections, provided it is given sufficiently early, but tryparsamide appears to be more efficacious in the case of *T. gambiense* infection. When the central nervous system is involved, treatment does not offer much hope.

While it is well known that the trypanosomes undergo a cycle of development in the flies and that there is a period of from two to three weeks after biting in which the flies are non-infective, there are good grounds for believing that in some instances direct transmission takes place from man to man.

The relationship between *T. gambiense* and *T. rhodesiense* is not settled, but there are grounds for believing that *T. rhodesiense* is actually a parasite of game

and that it is, in fact, *T. brucei*. The reasons for this are that *T. rhodesiense* infections occur in game-infested countries, far from other human beings, and are certainly transmitted by *G. morsitans* which is the natural transmitter of *T. brucei* to game.

In spite of the negative evidence obtained by KLEINE, TANTE and FISCHER regarding the infectivity of *T. brucei* for man, the author maintains that the evidence that *T. rhodesiense* is a game parasite stands.

Man appears to be the principal reservoir for *T. gambiense*, but there is no doubt that certain game animals can harbour the parasite. The water-buck, the reedbuck and the duiker are looked upon as the principal reservoir animals of *T. rhodesiense*.

Prophylaxis is hedged about with great difficulties. At present, eradication of human trypanosomiasis has been achieved in small areas only and it would seem that what is termed " modern civilisation " is the only factor which will prove effective for the final elimination of the disease and its carrier.

SOUTH AMERICAN TRYPANOSOMIASIS.—The human trypanosomiasis of Central and South America is quite different from the African diseases. The trypanosome *Schizetrypanum cruzi* is apparently a parasite of the armadillo, and bugs act as the transmitting agents. In the vertebrate, multiplication of the parasite takes place in the cells of the internal organs which results in the production of forms resembling Leishman-Donovan bodies.

Ticks of the genus *Ornithodorus* are also capable of transmitting the infection. A variety of animals can act as the reservoir of this parasite.

A. LESLIE SHEATHER.

DISEASES CAUSED BY FILTRABLE VIRUSES.

VIANELLO, Gino. (1931). Su un caso d'afta a manifestazioni esanteniatiche atipiche. [**A Case of Foot and Mouth Disease showing Atypical Exanthema**].—*Clin. Vet. Milano.* **12.** 460-464.

During the year, the Experimental Station for Infectious Diseases of Animals at Milan was asked to help in connection with an outbreak of disease among a herd of some 800 Simmenthal animals.

The animals had travelled for 10 or 11 days : the journey had been rather difficult owing to defective arrangements for feeding and watering and a certain number of deaths occurred as a result. About a week later, some of the animals showed intense salivation which was followed after a brief interval by the appearance of erosions of the buccal and nasal mucous membranes. Within a few days the disease had spread throughout the herd and the death rate was from one to three daily.

Inspection of the animals showed that the majority were in poor condition and that there was pronounced salivation in a large number of them. The skin lesions were to a large extent localised on the nostrils, muffle, lips and gums, and, to a less extent, on the tongue. In no instance, even in the animals which were showing marked salivation, was there any formation of vesicles or any detachment of fragments of the epithelium ; there were, however, necrotic lesions of the epithelium which had a crust-like appearance. In some cases there was marked lachrymation, but the discharge was not purulent and there were no opacities of the corneas. One or two animals were lame and a few, which showed no skin lesions, suffered from diarrhœa.

Post-mortem examination revealed the presence of a pronounced gastro-

enteritis, the entire alimentary tract presenting a striped appearance. Cattle plague was contra-indicated by the absence of ulceration of the fourth stomach, but, on the other hand, the myocarditis which is characteristic of foot and mouth disease was not found. There were no lesions in the bladder.

A diagnosis of foot and mouth disease was supported by the fact that typical foot and mouth disease broke out in the herds to which some of the imported animals had been drafted immediately after arrival; the diagnosis was confirmed by the successful inoculation of guinea pigs with some of the necrotic epithelium from the lesions. The possibility of the disease being pustular stomatitis was eliminated by the production of lesions in a guinea pig already immunised against that disease. Cattle plague was further eliminated by the injection of blood, taken from diseased animals during the febrile stage, into animals used for the production of anti-foot and mouth disease serum. No reaction of any kind occurred.

Although some 50 of the imported animals died, many of the deaths were no doubt due to exhaustion.

A. LESLIE SHEATHER.

BLIECK, L. de, & JANSEN, J. (1931). Het Onderzœk van met Mond- en Klauwzeer-virus besmette vaccine. **[Examination of Vaccine contaminated with Foot and Mouth Disease Virus].**—*Tijdschr. Diergeneesk.* **58.** 802-806.

The authors discuss the reported cases of the contamination of smallpox lymph with foot and mouth disease virus. They recommend that lymph be tested for this contamination by inoculating it intravenously and into the mucosa of the mouth of calves : they consider that guinea pigs are unreliable for this test as they are resistant and react erratically to a weak foot and mouth disease virus. When the reactions are negative, it is still necessary to prove by further injections of the three types of foot and mouth disease virus that the test animals were not already immune.

In conclusion, a scheme of regulations for the management of lymph-producing calves is given.

J. T. E.

COOPER, Hugh. (1931). **Directions for the Serum-Simultaneous Anti-Rinderpest Inoculation of Cattle.**—*Ind. J. Vet. Sci. & Anim. Husb.* **1.** 1-13. 14 charts, 4 figs., 1 table. [4 refs.]

This paper is a republication of the instructions now in force regarding the serum-simultaneous inoculation of animals against rinderpest.

The directions include information regarding the use of virus prepared from goats instead of cattle. This modification was made to obviate the transmission of parasites of the bovine blood by the virus injection. Charts show typical reactions given by goats inoculated with rinderpest virus and also the second reaction due to pneumonia.

Virus produced by goats is generally more " fixed " in virulence, but the virulence is definitely lower than that of cattle. Sections dealing with piroplasmosis, theileriasis and coccidiosis as complications of the simultaneous inoculation are added.

A. LESLIE SHEATHER.

LEDINGHAM, J. C. G. (1931). **The Aetiological Importance of the Elementary Bodies in Vaccinia and Fowl Pox.**—*Lancet.* **221.** 525-526. [8 refs.]

The author brings forward some new observations in support of the contention that the PASCHEN and BORREL bodies which are constantly present in the lesions of vaccinia and fowl pox, respectively, represent the actual viruses of these diseases.

Ledingham has previously reported that, in the early stages of the vaccinal lesion in the skin of rabbits, PASCHEN bodies increase greatly in number and appear to be free. In the healing stages of the lesion, the bodies congregate about the inflammatory cells of the exudate and would appear to be phagocytosed, but so far attempts to prove this have not been successful.

In fowl pox, the possibility of the BORREL bodies being the agents of the disease has been increased by the work of WOODRUFF and GOODPASTURE who demonstrated that a single BOLLINGER body can infect.

Ledingham has confirmed the observation that a BOLLINGER body is an aggregation of minute BORREL bodies. By means of a special technique, he has succeeded in obtaining practically pure suspensions of the " elementary bodies " and has carried out serological tests with these suspensions. He found that, in hanging drop preparations of the fowl pox " elementary bodies," no clumping occurred with the sera of normal chicks and that the sera of recovered and hyperimmunised fowls clumped the bodies in dilutions up to 1 : 160. Similarly, the PASCHEN bodies were agglutinated by hyperimmune rabbit sera, but not by normal rabbit sera.

T. M. DOYLE.

ROSENBUSCH, F. (1930). Sur une Maladie des bovins du Paraguay, voisine de la rage paralytique. [**A Disease of Bovines in Paraguay, resembling Paralytic Rabies**].—*C.R. Acad. Sci., Paris.* **191.** 967-968.

The disease referred to in this note has been known for a long time under the name " bovine mal de caderas ". Recently it appears to have extended into Bolivia and the Argentine.

The disease occurs sporadically and does not appear to be contagious. In some cases the onset of symptoms is marked by excitement and aggressiveness, accompanied by a slight rise in temperature and groaning. The characteristic symptom is a progressive ascending paraplegia of the hind legs which causes complete paralysis of these limbs in from three to five days. The death rate varies from 20 to 60 per cent. Under natural conditions the disease appears to attack bovines only.

Experiments indicate that the causal virus is to be found only in the central nervous system. Infection can be produced in rabbits by inoculation into the brain, the anterior chamber of the eye, the sacro-lumbar muscles and the subcutaneous tissues. Intraperitoneal inoculation has yielded negative results.

The species susceptible to experimental inoculation include the rabbit, the guinea pig and the goat ; the rat and the horse have not so far been infected. It would seem that only one infection experiment with a horse has been carried out and that none have been carried out with mice, dogs, monkeys or sheep.

In rabbits, the period of incubation ranges from 12 to 25 days, but with passage this period is reduced.

No lesions are discoverable on *post-mortem* examination save lymphocytic infiltration of all the organs, which, in the central nervous system, tends to produce " cuffing " of the capillaries. No negri bodies have been found.

The virus can be preserved in cold storage for periods up to two months in neutral glycerol.

Non-virulent organs produce immunity by inoculation and it is said that intraperitoneal injection of the virus, while harmless in itself, does produce resistance to intramuscular inoculation. Cross-immunity experiments with rabic virus are being carried out.

A. LESLIE SHEATHER.

ROSENBUSCH, F. (1930). Observaciones experimentales, histopatologicas y etiológicas del Mal de Caderas de los Bovinos del Paraguay. [**Experimental Observations, the Histopathology, and the Etiology of Mal de Caderas of Bovines in Paraguay**].—*Revist. Med. Vet.* **13.** [Abst. prepared from reprint ; paging not shown.]

The first publication on the subject of this disease was that by MIGONE in 1916. Within the last two or three years, the disease has assumed rather alarming proportions and has spread to areas in the Argentine which were formerly free from it.

The characteristic symptoms are, in the first place, excitement and a tendency to aggressiveness, followed by ascending paralysis of the hind legs, salivation and, in some cases, strabismus.

There is no evidence to indicate that the disease is contagious, but it is certainly inoculable. The virus, which can be maintained by passage, appears to be confined to the central nervous system, as inoculation with materials from other organs has invariably failed to cause infection. Inoculation of virulent material into the nervous system, the anterior chamber of the eye and the lumbar muscles causes infection, but intravenous and intraperitoneal inoculation fail.

In rabbits, the period of incubation ranges from 11 to 32 days and the period of visible illness from 13 to 15 days. In the dog and goat, the same symptoms occur as in the rabbit and guinea-pig.

The only lesions found in laboratory animals are those indicating disturbance of the circulation, i.e. passive congestion and consequent degeneration of various organs. Microscopic examination of the heart muscle reveals the presence of an interstitial myocarditis ; the meninges are congested and there is an increase in the amounts of the cerebro-spinal fluid. The urine of dogs and rabbits contains five to seven parts per thousand of glucose.

Histological examination of the various tissues and organs affords the following information :—

HEART.—Transverse striation indistinct, some reduction in the thickness of some of the fibres, nuclei shrunken and cytoplasm markedly acidophile.

LUNGS.—The alveoli are dilated ; some contain a granular material and others red blood corpuscles.

LIVER.—The central veins of the lobules are dilated and the intralobular capillaries are congested. The SPLEEN also shows congestion and there are large deposits of blood pigment.

KIDNEYS.—These show congestion of the glomerular capillaries, pycnosis of the cells and deposits of hæmatoidin. The convoluted tubes contain masses of desquamated cells and red corpuscles. In some cases, the acute lesions are associated with lymphocytic infiltration and proliferation of the connective tissue.

NERVOUS SYSTEM.—Lesions occur in all parts of the central nervous system and particularly in the grey matter. Capillaries show " cuffing " by lymphocytes, but large mononuclear leucocytes and plasma cells are also present. The vessels

show general congestion and small hæmorrhages may be found in the hemispheres. The ganglion cells are vacuolated and oxyphil.

In two cases, bodies resembling Negri bodies were detected in the hippocampus.

A. LESLIE SHEATHER.

LEVADITI, C., & LEPINE, P. (1931). Recherche, par la cataphorèse, du virus poliomyélitique dans la moelle de singes atteints de lésions chroniques. **[Investigations, by Cataphoresis, of Poliomyeloitic Virus in the Medulla of Monkeys suffering from chronic Lesions].**—*C.R. Soc. Biol. Paris.* **106.** 34.

A paper following up the work of OLITSKY, RHOADS and LONG [(1929). *J. Exp. Med.* **50.** 263 & 273.] which showed the the presence of poliomyelitic virus in latent form in the medullary substance of recovered monkeys.

The authors fail to confirm the observations of the earlier workers, obtained by concentration of virus by electrophoresis. They inoculated a *Macacus cynomolgus* intracerebrally with medullary emulsion from a human case and reproduced poliomyelitis, from which the animal recovered but retained definite paralytic symptoms. It was tested against the virus of passage, found resistant, and then killed for preparation of emulsion of medulla. This emulsion was subjected to cataphoresis [apparatus described by LÉPINE, P. (1930). *C.R. Soc. Biol. Paris.* **105.** 282.] and the liquid and coagulate from both poles injected into monkeys. Neither the emulsion itself, nor the anodal component, nor the kathodal component, produced any effects (38 days' observation).

A second experiment with *Macacus rhesus* gave a similarly negative result (42 days' observation) and the authors thus failed to demonstrate the presence of virus in latent form. [Compare this *Bulletin.* **2.** 35., abstract of paper by NICOLAU, KOPCIOWSKA and CONSTANTINESCO, followed by comments from M. A. NETTER].

H. H. GREEN.

DISEASES CAUSED BY METAZOAN PARASITES.

PFAFFMAN, G. A. (1931). **Eradication of Sheep Scabies from San Clemente Island.**—*Monthly Bull. Dept. Agric. California.* **20.** 540-543.

Describes the methods employed to eradicate sheep scab from this island, the last part of California State to remain infected. San Clemente Island is 40 miles from the mainland, mainly very rocky, with a population of 15,000 sheep and several thousand wild goats.

Geographical conditions were largely responsible for the continued existence of scab, but in 1930 the problem was attacked thoroughly and, by rigorous supervision to prevent the omission of individual animals, the entire herds of sheep were dealt with ; movements were controlled by the use of appropriate fencing and the sheep were dipped. The chief difficulty was the rounding up of the animals which were in a wild state. Those which could not be driven in a flock were shot.

The gathered sheep were dipped twice in July and thereafter were confined to a small area while the " outlaws " were gradually hunted down and shot. No case of scab was found among the 12,000 survivors after a second round up and dipping early in 1931.

Most of the goats were killed to make more room for sheep. The authorities now consider that, as a result of scab eradication and organised pasture control, the sheep industry in San Clemente will soon increase markedly in value.

J. T. E.

BRUMPT, E. (1931). Némathelminthes parasites des rats sauvages (*Epimys norvegicus*) de Caracas. I. *Protospirura bonnei.* Infections expérimentales et spontanées. Formes adultes et larvaires. [**Nematodes Parasitic in the Wild Rat** (*Epimys norvegicus*) **in Caracas. I.** *Protospirura bonnei.* **Experimental and Spontaneous Infections. Adult and Larval Forms**].—*Ann. Parasitol.* **9.** 344-358. 9 text figs. 1 plate, 1 key. [21 refs.]

While working in Caracas, the author came across a spirurid larva in the cockroach *Rhyparobia maderæ*, which is very common in Venezuela and, by feeding it to a rat, he obtained the mature worm. He afterwards found the same species in 30 out of 750 wild rats (*Epimys norvegicus*) which he examined, a proportion of four per cent. The worm was found to belong to the genus *Protospirura* and to resemble most closely the species *P. bonnei*, but it showed some variation from ORTLEPP's description of that species. On making comparisons with ORTLEPP's material, however, it was evident that all belonged to the one species. The author, therefore, redescribes *Protospirura bonnei* from his material, the principal point in the emended description being that the head carries twelve teeth and not four as described by ORTLEPP.

The predilection seat of this worm in the rat is the pyloric end of the stomach. Heavy infestations may be present at times and in one experimental rat no less than 50 adult females and 19 males were recovered; these 69 worms together weighed 3·15 g. In a heavy infestation, the stomach of the rat becomes considerably distended, but even so no symptoms of any kind were observed, nor could any local lesion be demonstrated on *post-mortem* examination. As yet no definite information can be given on the longevity of the worms, but some experimental rats which are still under observation have retained their infection for seven months.

Attempts to infect various arthropods produced negative results in *Periplaneta americana*, *P. australasiæ*, *Tenebrio molitor*, *T. obscurus* and the larva of *Onixus* sp., but heavy infestations were obtained in *Rhyparobia maderæ* and *Blattella germanica* and a more feeble infestation in *Periplaneta oritentalis.* In the experimental feeding of *Blattella germanica*, the larvæ were found to penetrate the intestine and to move freely in the body cavity for some days. At the fifteenth day they had become encysted and measured 1·375 mm. Larvæ which were 52 days old and had reached the length of 2·700 mm. developed into adults when fed to rats.

The author gives a brief description of the third stage larva and a key to all the known species of *Protospirura.* In the near future he intends to publish a second paper in which he will give a detailed account of the morphology and biology of the larvæ.

E. L. TAYLOR.

I. WETZEL, R. (1931). **Description of a New Species of Amidostomine Worm of the Genus** *Epomidostomum* **from the Gizzard of Anserine Birds.**—*Proc. U.S. National Museum.* **78.** Art. 21. 1-10. 1 key, 12 figs. [10 refs.]

II. OTTE, W. (1931). *Heterakis* (*Ascaridia*) *perspicillum* (*inflexa* Rud. 1803) oder *Het.* (*Asc.*) *lineata* Schneider 1866. [*Heterakis* (*Ascaridia*) *perspicillum* (*inflexa* **Rud. 1803**) **or** *Heterakis* (*Ascaridia*) *lineata* **Schneider 1866**].—*Berl. tierärztl. Wschr.* **47.** 229.

III. SPREHN, C. (1931). *Ascaridia lineata* (Schneider 1866), der häufigste Spulwurm der Hühner. [*Ascaridia lineata* (**Schneider 1866**) **the Commonest Ascarid of the Fowl**].—*Berl. tierärztl. Wschr.* **47.** 229-230.

I. The author here describes a new species of *Epomidostomum* which he has found under the cuticular layer of the gizzard of a Canada goose, *Branta canadensis canadensis*, and a blue goose, *Chen cærulescens*. The name *Epomidostomum crami* is proposed for this species and a detailed description is given. The author provides aids for its determination in the form of a key to all the members of the genus and a list of the special points which serve to differentiate the species from *E. orispinum* and *E. skrjabini* which it most closely resembles.

While searching through the helminthological collection of the Bureau of Animal Industry, the author also found *Epomidostomum uncinatum* under the cuticular layer of the gizzard of a cinnamon teal, *Querquedula cyanoptera*. This is the first record of the species in America and the author includes a detailed description of specimens from the material at his disposal.

II. The author, who has a wide experience of poultry husbandry and is the editor of a book on poultry diseases, here expresses his disagreement with SPREHN who, in a previous article in the *Berl. tierärztl. Wschr.*, had asserted that the common round worm of poultry is *Ascaridia lineata* and not *Ascaridia perspicillum*. Otte refers to NEUMANN, 1909, NEVEU-LEMAIRE, 1912, DUJARDIN, 1845, and to BURBAGALLO and SKRJABIN, 1926, who state that *A. perspicillum* is of very common occurrence ; Otte points out that SCHNEIDER first found *A. lineata* in a Brazilian wild fowl. How then, he asks, can it be said that *Heterakis* (*Ascaridia*) *perspicillum* is not found in Germany ?

III. In reply to this, Sprehn quotes at length from his own contribution, published in 1928, on the identity of the round worm of poultry in Germany, in which he showed that the species is *Ascaridia lineata*. He also gives references to seven publications which show that this is the commonest species in Asia, Africa, North and South America, the Philippines and parts of Germany. [According to a recent publication by ACKERT, Great Britain may now be added to this list.]

He corrects the error in the nomenclature which OTTE uses and concludes that the proper name for the common round worm of fowls throughout the world is *Ascaridia lineata* (Schneider 1866).

E. L. TAYLOR.

BACIGALUPO, J. (1931). Evolution de *l'Hymenolepis fraterna* Stiles, chez *Pulex irritans* L., *Xenopsylla cheopis* Rothschild et *Ctenocephalus canis* Curtis. [**The Development of** *Hymenolepis fraterna* **Stiles in** *Pulex irritans* **L.**, *Xenopsylla cheopis* **Rothschild and** *Ctenocephalus canis* **Curtis**].—*Ann. Parasitol.* **9.** 339-343. 2 figs. [8 refs.]

In 1928, the author reported that he had been successful in infecting the larvæ of fleas with *Hymenolepis nana* and *Hymenolepis fraterna*. As, however, he only found the characteristic hooks of the cestodes in the body cavity and was not able to demonstrate a complete cercocystis, he thought it necessary to repeat the work and here publishes the results of further experiments.

In these experiments, he attempted to infect about 50 larvæ of *Ctenocephalus canis*, six of *Pulex irritans* and ten of *Xenopsylla cheopis*. The first developing cestode was observed on the tenth day after the experimental feed was given. Seventeen days after the experimental feed, five adult *Ctenocephalus canis* emerged and two of them were found to contain cestode larvæ bearing the crown of hooks charactersitic of *Hymenolepis*. One of the three *Pulex irritans* and two of the four *Xenopsylla cheopis* which reached the adult stage contained *Hymenolepis* larvæ.

The author thinks it highly probable that these three species of flea can act as intermediate hosts for *Hymenolepis nana* as well as for *Hymenolepis fraterna*.

E. L. TAYLOR.

BAYLIS, H. A. (1931). *Gammarus pulex* **as an Intermediate Host for Trout Parasites.**—*Annals and Magazine of Nat. Hist.* (Ser. 10.) **7.** 431-435. 4 figs. 1 table. [8 refs.]

While examining over 100 *Gammarus pulex* for the intermediate stage of a trout cestode, the author encountered two other larval forms which appear to belong to species parasitic as adults in trout. About five of the *Gammarus* each contained, free in the body cavity, a single cyst which appears to be the metacercarial stage of *Crepidostomum farionis*. Six *Gammarus* contained a larval nematode which appears to belong to the species *Cystidicola farionis*. The determination of the genus is almost certain and it is thought probably to belong to the species *C. farionis* on account of that species being so much more widely distributed than *C. impar*. A description of the larvæ is given along with a table in which comparisons are made between measurements of the forms taken from *Gammarus* and of *C. farionis* and *C. impar* from trout.

This is thought to be the first observation made on the life history of *Cystidicola*. Two forms of nematode larvæ were described by VON LINSTOW from the body cavity of *Gammarus pulex*, *Spiroptera gammari* (1892) and *Spiroptera pulex* (1894). The latter is considered by SEURAT (1919) to be the fourth-stage larva of *Tropisurus fissispinus*, a parasite of ducks and other birds.

E. L. TAYLOR.

SCHMEY, M., & BUGGE, G. (1931). Zur Lebensfahigkeit der Finnen. [**On the Vitality of Cysticerci**].—*Berl. tierärztl. Wschr.* **47.** 193-199. 6 tables, 5 figs. [5 refs.]

Meat inspection methods of controlling *Trichinella spiralis* and *Tænia solium* may be regarded as satisfactory, but the control of *Tænia saginata* leaves much to be desired, as is shown by the large number of infected carcasses which are found every year.

The cause of this is probably to be found in the faulty management of infected carcasses before they are liberated for sale in the open market. The existing regulations require the cooking of all measled pork, but measled beef may be freed after 21 days in the cold store.

Experiments were carried out by the authors to ascertain whether storage for this period kills the cysts. They placed specimens of *Cysticercus cellulosæ* and *Cysticercus bovis*, both free and contained in the meat, at conditions of cooling and of freezing, and tested for the end point of vitality by observing the ability of the cysts to evaginate in bile salt solution and the movement of the flame cells in the scolices. The details of their method of testing are described.

The tests on *Cysticercus cellulosæ* showed that, at a cold room temperature of 1° to 4° C., the end point of vitality was reached after 70 days, while, at a temperature of –8° to –10° C., free cysts and those contained in small pieces of flesh were killed in four hours.

The same experiments with *C. bovis* were not so easy to carry out because of the variation in the age and resistance of different cysts in the same carcass. Some reliable tests were, however, carried out on particularly good material which came into the author's possession and it was found that, while the end point of vitality is not reached in less than 39 to 41 days at 1° to 4° C., at –8° to –10° C., the cysts are killed in three to four hours. A temperature of –6° C. was found to be just as effective and it was shown that the depths of a piece of beef 32 cm. in thickness, exposed to a temperature of -8° to –10° C., fall to –6° C. in three days.

There must be considerable difference between the end point of vitality and the end point at which the vitiated cysts become incapable of development to the mature worm in man; the authors propose to carry out more work on that question.

On account of the loss of vitality shown in the experiments, it is considered that 28 to 30 days in the cold room at 1° to 4° C. would probably render beef safe, but it is recommended that, on the grounds of safety and economy, the practice of freezing at –8° to -10° C. for three or four days should be adopted in preference to cooling for a longer period.

E. L. TAYLOR.

JAY, R. (1931). **The Control of Liver Fluke.**—*Monthly Bull. Dept. Agric. California.* **20.** 544-555.

The author reports success in a campaign against ovine distomatosis in which dosage of the sheep with 1 c.c. of carbon tetrachloride three times at intervals of three weeks and the treatment of snail-infested waters by copper sulphate had been carried out. It was found that poisoning of the sheep by the carbon tetrachloride occurred only in cases where the diet was changed during, or within a few weeks prior to, the treatment, but no explanation was found for this behaviour.

Bovine distomatosis is best attacked by prophylactic methods by attention to the drinking water as carbon tetrachloride is unsafe for cattle. The aeroplane is useful where large areas of water have to be dealt with; the copper sulphate is best dropped as a powder on to the banks of rivers and ponds.

J. T. E.

TAYLOR, E. L. (1931). **The Fæces in Worm Diseases: their Value for Diagnosis, and their Hygienic Disposal on the Farm.**—*Vet. Rec.* **11.** 639-644.

This paper deals with the diagnosis of intestinal and pulmonary helminthiasis in veterinary practice by the examination of fæces, the subject being discussed under two headings:—" The Examination of Fæces " and " The Interpretation of Results." It is necessary in the first place to be able to recognise the eggs or larvæ of the various species of parasitic worms. Almost all the parasitic worms of the dog and cat can be differentiated by the characters of the eggs, but unfortunately many of the worms of cattle, sheep and horses produce eggs which are so much alike that the species cannot be differentiated by this means.

A short account is given of the most advantageous method of making a macroscopical examination for the presence of mature worms or a microscopical examination for the presence of eggs or larvæ. The microscopical methods are discussed under the headings " The Best Methods for the Detection of Parasitic Worms " and " The Methods best suited to the Diagnosis of Worm Disease." It is pointed out that there is a great difference between these two steps in diagnosis as, for the diagnosis of disease, it is necessary to know something of the relative number of worms present. The second part of the paper deals principally with this point. Even if exact information were available as to the number of eggs which each species of worm produces in 24 hours, it would be impossible to make an exact diagnosis of helminthiasis by this method as the fæces, the worms and the host are all liable to very considerable variation, so that the egg count and its bearing on the presence of worm disease is affected. It is held, however, that, in spite of these limitations, egg counting methods are a great aid to the diagnosis of helminthiasis.

The paper terminates with a short discussion on the importance of the proper disposal of infected manure, and the author recommends that manure heaps should be covered with earth to ensure the thorough putrefaction of the whole mass.

E. L. TAYLOR.

PHÉLOUKIS, T., & KNITHAKIS, E. (1931). L'Habronémose cutanée en Grèce. **[Cutaneous Habronemiasis in Greece]**.—*Bull. Acad. vét. de France.* **4.** 121-124.

Cutaneous habronemiasis has not previously been recognised in Greece, the lesions having been confused with those of other conditions. In the fall of 1929, an epizootic of granular dermatitis occurred among the horses at a show in Athens and afforded a spendid opportunity for the study of the disease. Two clinical types could be recognised :—

(1) A " granular eczematous dermatitis " which occurs on the upper parts of the body at points of contact with the harness ; this shows a tendency to spread to other parts of the body and causes an intense pruritis.

(2) " Granular sores " which occur on the extremities ; cauliflower-like growths develop, but they show little tendency to spread.

Granular eczematous dermatitis was observed in 30 per cent. of the infected horses and granular sores in 70 per cent.

A study was made of the morphology of larvæ collected from the summer sores and also of larvæ collected from *Musca domestica* caught in the vicinity of infested stable manure ; 12 per cent. of the flies proved to be infected. The characters of the larvæ, a mention of which is made in the paper, enabled the authors to determine the species as *Habronema megastoma*. Taking this into consideration, along with the findings at the *post-mortem* examination of horses, the authors conclude that *H. megastoma* is the sole cause of cutaneous habronemiasis in Greece.

E. L. TAYLOR.

BARION, F. (1931). Un cas de cœnurose intermusculaire chez un lapin sauvage. **[A Case of Intermuscular Cœnurosis in a Wild Rabbit]**.—*Ann. Méd. vét.* **76.** 209-213. 2 figs.

The author has encountered a peculiar *Cœnurus* cyst in the wild rabbit.

He describes it as being the size of a nut and composed of two distinct elements, transparent vesicles and large opaque grains, which were closely united together by fine connective tissue. By careful manipulation he was able to separate 25 transparent vesicles varying in size from that of a hemp seed to that of a small mulberry. The cyst wall was transparent except in certain parts where the presence of isolated nodules or small groups of nodules made it opaque. On microscopical examination, these nodules were found to be the heads of tænia provided with a double crown of hooks. Fifty-three of the opaque grains were found. These were smaller than the smallest vesicle, but larger than the largest nodule in the vesicles and, on microscopical examination, were found to contain scolices similar to those seen in the vesicular nodules.

It is considered that the transparent vesicles and the opaque grains had all arisen from one hexocanth embryo, that the cyst which developed from the embryo gave rise to scolices on its inner side in the usual way and also to daughter cysts on its outer side, these in turn giving rise to more scolices. This observation suggests that *Cœnurus serialis* is an intermediate form between *Cœnurus cerebralis* and *Echinococcus*.

E. L. TAYLOR.

SENEVET, G. (1931). Un test pratique en Parasitologie clinique. [**A Practical Test for Use in Clinical Parasitology**].—*Bull. Soc. Path. exotique.* **24.** 284-286. 1 fig.

A frequent cause of error in the microscopical examination of fæces by students for the eggs of helminths, or the cysts of protozoa, is due to the variation in the apparent size of these bodies resulting from the use of different microscopes and of different magnifications. In order to overcome this difficulty, the author suggests the admixture with the fæces of some elements of constant size and characteristic shape so that a standard of comparison may always be at hand.

Lycopodium powder is very suitable for this purpose ; it is composed of the spores of *Lycopodium clavatum* which vary in diameter from 30 μ to 35 μ and are thus comparable in size to the eggs of helminths. This powder, which is used in the coating of pills can be obtained at any druggists and it is suggested that the isolated worker may find it very useful when other means of micrometry are not available.

E. L. TAYLOR.

RAFFENSPERGER, H. B. (1931). **Internal Parasites of the Horse.**—*Vet. Alumni Quart., Ohio.* **18.** 171-179.

The author gives in popular language an account of the parasites of horses in Montana and reports some observations made on the vitality of strongylid larvæ. The occurrence of *Oesophagodontus robustus* is reported in Montana, this being the first record of its occurrence in the United States. *Anoplocephala magna* is reported to be the commonest member of the genus *Anoplocephala* found in Montana, and *Strongylus equinus* to be the commonest member of the genus *Strongylus*. No species of *Habronema* has yet been found in Montana. An experiment was carried out to determine the longevity of strongylid larvæ outside the body of the host. Piles of infested horse manure, protected from flies by wire screens, were placed on open pasture. It was found that, in spite of low temperatures falling to –38° F., the larvæ survived two winters and one summer without reaching the end point of their vitality.

Observations were also made on manure taken from 12 inches below the surface of a yard from which no manure had been removed for seven years ; it was found that living larvæ were still present. [The time at which manure was last put into the yard is not mentioned.] Efforts to isolate larvæ from the soil near infected manure have failed.

Experiments have been commenced on the rearing of foals free from worm parasites. Mares have been treated with chenopodium soon after foaling and have then been removed to clean pasture, together with the foals. Up to the present time, attempts to eliminate all parasites have not been quite successful, but the number acquired by the foals used in the experiment has been very small.

Experiments are also being carried out to ascertain the effect of strongyle infestation in horses. Two groups of colts have been divided equally and half of each group is to receive chenopodium treatment twice yearly, the effect of this treatment to be tested by monthly observations of the body weight. As yet there are no results to report. [The author does not state whether a detailed account of his experiments has yet been published.]

E. L. TAYLOR.

DISEASES, GENERAL.

—. (1931). **Report of the Special Committee on Poultry Diseases.**—*J. Amer. Vet. Med. Ass.* **79.** 522-524.

The Committee reviewed the progress made during the year in the investigation of laryngotracheitis. Beach (1930), Beaudette (1930), Gibbs (1931), and Graham, Thorp and James (1931) have independently established a filter-passing virus as the probable etiological agent of the disease. Seifried has demonstrated the presence of intranuclear inclusion bodies in the epithelial cells, an observation which provides additional evidence in support of a virus as the causal agent.

In view of the confusion which exists regarding the nomenclature of the infection, the committee suggested that it should in future be termed " Infectious Laryngotracheitis."

During the year under review, the Bureau of Animal Industry, U.S.A., distributed to research workers a strain of pigeon pox virus received from the Veterinary Laboratory, Ministry of Agriculture, Weybridge, which has been successfully employed on a large scale in Great Britain for the immunisation of fowls against fowl pox.

Reports received by the Committee confirm the innocuity of the vaccine, but there appears to be some difference of opinion regarding its protective powers against natural infection with fowl pox in the United States.

The Committee recommended that further investigations should be undertaken on the pigeon pox vaccine, but that it should not be generally substituted for the fowl pox vaccine [prepared from fowl pox virus] at present in use, until such time as it has been proved to confer a solid immunity against fowl pox in the United States.

T. M. DOYLE.

Mills, R. H. (1931). **Some Infectious Diseases of Sheep.**—*Monthly Bull. Dept. Agric. California.* **20.** 522-527.

The author gives brief accounts of the following sheep diseases, describing

their nature and advising as to treatment :—anthrax, " blackleg ", tetanus, caseous lymphadenitis, infectious pustular dermatitis, " white scour " in lambs (colon-paratyphoid infection) and *B. necrophorus* infections ; under the latter he refers to " lip and leg ulceration," " foot rot " and spotted liver disease in young lambs. As a dressing for foot rot, he recommends an ointment composed of tartar emetic and lanolin (equal parts).

J. T. E.

BOSWORTH, T. J., & GLOVER, R. E. (1931). **Some Observations on the Nature of certain Diseases of Sheep.**—*Paper presented at the 49th Ann. Congr. National Veterinary Medical Association* (*Gt. Britain & Ireland*) [*Norwich, Aug. 22nd-28th*]. 7 pp. [21 refs.]
Discussion (but not paper) published *Vet. Rec.* **11.** 1027-1036.

—. (1931). **Observations on certain Diseases of Sheep.**—*Ibid.* 1037-1038.
The second reference consists of an Editorial note on the subject.

VENEREAL DISEASE OF SHEEP.—A venereal disease is known in the eastern counties of England ; it does not occur frequently, but the authors observed two outbreaks in 1930. The disease takes the form of a pustulo-ulcerative eruption of the vulva in ewes and a similar eruption of the penis and prepuce in rams. Material obtained by swabbing lesions of natural cases caused the typical eruption when applied to a scarified area of the thigh and when inoculated intradermally into the mucous membrane of the vulva of lambs. An eruption appeared in 48 hours and a scab was formed on the fourth day. Dried scab crusts from these experimental cases, when emulsified in normal saline solution and applied to scarified areas of skin, produced lesions similar to those caused by the virus of contagious pustular dermatitis. So far the authors have been unable to demonstrate a filtrable virus of the venereal disease, but they believe that it is closely related to the virus of contagious pustular dermatitis. Sheep which had recovered from one attack resisted re-infection with dried scab material ; no cross immunity occurred between the venereal disease and the pustular dermatitis. It was found further that the infective agent of the venereal disease was distinct from the filtrable virus of dermatitis with regard to the predilection sites. In the course of the discussion, Glover said that contagious pustular dermatitis malignant aphtha and the disease " orf " are probably identical and that *B. necrophorus* is only present as a secondary invader. The venereal disease is distinct from these conditions.

PREGNANCY DISEASE.—This disease occurs in many parts of the world ; it is characterised by the death of pregnant ewes a short time before full term. Overfeeding was formerly considered a cause, but it is now known that the disease occurs in sheep which have been underfed as well as in those which have been overfed. The most prominent lesion found at autopsy is a fatty liver. Biochemical analyses carried out on affected ewes have shown that the urine contains excess of acetone, albumen and ammonia. A condition of acidosis is present and the amount of non-protein nitrogen in the blood is from two to six or more times above the normal. The blood sugar varies and may be above or below the normal amount. The etiology is unknown: an intoxication of unknown origin appears to be present. No reliable treatment has been discovered. Glucose medication, udder inflation and purgative treatment have all produced a few recoveries. A change of diet seems of some value as a prophylactic measure.

In the discussion, MONTGOMERIE reported the occurrence of pregnancy disease

in mountain sheep which had received no extra food. As regards exercise as a prophylactic, some members reported that forced exercise of pregnant ewes had appeared to reduce losses [see paper by LESLIE, *infra*].

"LAMBING SICKNESS" is analogous to "milk fever" in cows and is curable by udder inflation. Calcium gluconate injections have not been as successful as in "milk fever."

"PULPY KIDNEY DISEASE" IN LAMBS.—This condition usually occurs in lambs between 8 and 16 weeks old which are being fattened for the butcher, but cases do occur in older lambs. Affected lambs are usually found dead. It has been suggested that a high protein diet is etiologically associated with the disease. The kidneys show the most striking pathological change: they are very soft and have a mottled appearance; the cortical tissue is often disorganised and semi-fluid. The liver is usually hyperæmic. Histological examination of the kidneys shows mass necrosis of the cortex whilst the medulla is merely congested. GILL has reported this disease in New Zealand and DAKIN has also reported it in Western Australia where it is known under the name of "Beverley Disease."

The etiology of "pulpy kidney disease" has been investigated by STEWART in England. He was unable to produce the disease in lambs by feeding food very rich in protein. It was thought that an absorption from the bowel of a toxin (perhaps of the anaërobe *Cl. welchii*) might be the cause of the kidney lesion and experiments were carried out in this connection. Lambs fed for three weeks on a high protein diet were injected intravenously with cortical substance from a clinical case and other subjects were injected with *Cl. welchii* cultures, but no harmful effects followed. *Cl. welchii* toxin however caused renal changes not unlike those of "pulpy kidney disease". The authors disagree with GILL's suggestion that the lesions seen in the kidney occur *post-mortem*. They draw attention to an abnormal amount of sugar in the urine in affected lambs, referring also to a paper by BAKER, REID & OWEN [see this *Bulletin*. **2.** 33] on "diabetic coma" in sheep, which they consider may have some resemblence to "pulpy kidney disease". MONTGOMERIE reported on the disease in lambs three to six weeks old in North Wales [see paper by MONTGOMERY & ROWLANDS—*infra*].

PYOGENIC INFECTIONS.—Several bacteria are commonly associated with these infections which are very numerous in sheep of all ages; they include:—streptococci, *B. pyogenes*, *B. coli*, *B. necrophorus*, *Pasteurella* species and the B. of Preisz-Nocard. In lambs the infections are often generalised ("navel ill", "joint ill", etc.) whilst in adult sheep they are often chronic and localised. A short survey of the literature on these diseases is given and some new organisms are described including two gram-negative bacilli isolated by the authors at Cambridge. PARKER gave an account of caseous lymphadenitis in imported sheep from the meat inspection viewpoint.

CONTAGIOUS ABORTION.—The authors describe the finding of *B. abortus ovis* in several outbreaks of ovine abortion. Many deaths occurred in ewes after abortion. It is hoped that vaccination may be valuable for control purposes, but no work has yet been done on this aspect of the subject.

Vibrio fetus is responsible for a small number of abortions encountered. In the discussion some clinical information on ovine abortion was produced.

J. T. E.

MONTGOMERIE, R. F., & ROWLANDS, W. T. (1931). **"Pulpy Kidney Disease" of Young Lambs in North Wales.**—*Vet. J.* **88.** 401-410. [7 refs.]

Under this heading the authors refer to sudden deaths characterised by the

particular renal lesion, which have been observed in forward lambs three to six weeks old for the last seven years in North Wales.

The losses, which average one and have reached six per cent. in affected flocks, occur within a short period about the early part of April and recur in successive years on particular farms and areas. No significant connection between the hand feeding of ewes and the deaths in lambs has been established. Sudden weather changes appear to precede the trouble.

Affected lambs die very suddenly after lying stretched out on their sides for a time. The chief lesions are :—congestion of the abdominal viscera, particularly of the small intestine, enlargement of the mesenteric lymph glands, excess fluid in the pericardial sac with sub-epicardial and sub-endocardial hæmorrhages and the peculiar renal lesion. The kidney cortex is greatly congested ; hæmorrhages are present in it and in animals not seen immediately after death, it is broken down into a pulpy mass.

Bacteriological examination of 20 cases yielded negative results. It has been observed that losses from pulpy kidney disease have been less numerous in lambs inoculated soon after birth (12 hours) with lamb dysentery serum.

The authors discuss the nature and etiology of the disease [see the paper by Bosworth & Glover *supra*] and consider that it is identical with the condition occurring in New Zealand and described by Gill [*New Zealand J. Agric.* of 1927, 1928, 1929 & 1931] under the same name.

Tests were carried out on the toxicity of filtrates of the intestinal contents of lambs which had died from "pulpy kidney disease" when injected intravenously into healthy rabbits. The filtrates were uniformly sterile; in some cases the injections caused death and in others there was no adverse effect. The nature of the toxic principle contained in the filtrate was not discovered; it was evidently not a toxin of *Vibrion septique*, *B. welchii* (lamb dysentery strain) or of *B. œdematiens* as antisera of these organisms did not neutralise it. Gill [(1931) *New Zealand J. Agric.* **42.** 300] obtained similar results.

The authors now incline to the theory that the disease is due to intoxication by the products derived from disintegration of protein in the intestine.

J. T. E.

Masheter, J. W. H. (1931). **Pulpy Kidney Disease.**—*Vet. J.* **87.** 536-537.

This does not refer to "pulpy kidney disease" of lambs, but merely records the *post-mortem* finding of a peculiar renal lesion in a calf which had died from some illness of unknown causation.

J. T. E.

I. Rensburg, S. Van. (1931). **Pregnancy Disease on Ewes in South Africa.**—*Vet. Rec.* **11.** 1147-1148. [5 refs.]

II. Leslie, A. (1931). **Pregnancy Disease in Ewes in New Zealand.**—*Ibid.* 1148-1149.

I. This disease was first recognised in 1924 and, in 1926-27, its incidence spread extensively in the Cape Province and Southern Free State where severe losses were sustained, chiefly on pasture dried by drought and rather overstocked. The symptomatology described is similar to that of the disease in England. The common South African name is "domsiekte."

In discussing the *post-mortem* finding of fatty infiltration of the liver, the

author points out that some degree of this condition is normal in pregnant ewes. Bonemeal, administered by the mouth (one ounce per ewe daily) and provided as a lick, has yielded success both as a preventive and as a curative measure.

The author believes that a hypocalcæmia is present in affected animals and that its effect is produced relatively slowly by the demands made by the fœtuses (most cases occur in ewes carrying twins) as compared with the sudden onset of the syndrome in cows affected with milk fever which is initiated by the withdrawal of milk.

II. Leslie has worked on this disease for two years in the Veterinary Department, Canterbury Agricultural College, New Zealand, where it has been very prevalent during the last year or two. He considers that underfeeding and unbalanced feeding are at the root of the trouble and that the enforced exercise of ewes in the weeks prior to lambing has no special preventive value.

Glucose has been found useful as a curative agent and about 40 per cent. of cases treated with glucose (16 ounces) subcutaneously and treacle ($\frac{1}{2}$ to $1\frac{1}{2}$ lbs.) by the mouth have been saved. Leslie has so far " failed to diagnose a case of pregnancy disease that was due to excessive fatness " ; it has, however, been produced in ewes by unbalanced feeding. He says that details are given in *Bulletin 22 of Canterbury Agric. College, N.Z.* [Bulletin not yet received.]

J. T. E.

Ramirez, Rafael de Castro y. (1931). Profilaxis de los Enfermedades del Cerdo **[Prophylaxis of the Diseases of the Pig]**.—*Revist. Zootech.* **18.** 225-234.

This paper is a reprint from the *Revista de Agricultura, Comercio y Trabajo de Cuba*, and is intended to be read by laymen. It gives a superficial description of the common diseases of pigs and some of the methods that can be used to control them.

A. Leslie Sheather.

Robin, V., & Brion, A. (1930). Exostoses ostéogéniques multiples chez le chien. **[Multiple osteogenic Exostoses in the Dog]**.—*Rev. gén. Méd. vét.* **40.** 205-277. 6 figs. [4 refs.]

The authors describe a disease in dogs characterised by the development of exostoses at the epiphyso-diaphyseal junctions of various bones,. The bony growths begin in early life and increase slowly and painlessly until maturity is reached. They then remain stationary and have the form of ordinary bone, varying in texture from spongy to compact. Two clinical cases of the condition in German sheep dogs are described in detail and its pathology and origin are discussed. The disease is not associated with any of the known dietary deficiencies ; it appears to have some hereditary connection.

J. T. E.

Rossi, Paul. (1931). La maladie de la peur chez le chien, " Fright Disease." **[Hysteria in the Dog]**.—*Rev. gén. Méd. vét.* **41.** 201-223. [45 refs.]

This paper reviews the knowledge on " hysteria " and includes the personal observations of the author on some 180 cases. The author describes five types according to the symptomatology. In the ambulatory type, the pupils are dilated, the dog emits piercing howls, runs away, loses self-control, slobbers at the mouth

and may bite; these cases usually recover. In the staggering type, the animal throws itself down after trembling and walking with difficulty, then quickly recovers. In the hallucination type, the dogs appear to have a terrifying vision. The epileptiform type is the most striking; the animals show semi-coma, clonic spasms and loss of reflex controls. The symptomatology is often of a mixed type and recovery may occur in a few minutes or may take some days. Fear is the predominant symptom. The disease originally appeared to be seasonal, but with the increased incidence it seems to occur all the year round. The mortality is increasing because the epileptiform type, the most serious, is becoming more common. Etiologically, many theories have been advanced, but there is no admissible evidence in support of any of them.

NORMAN HOLE.

DOWNHAM, K. D. (1931). **Fowl Paralysis.**—*The Harper Adams Utility Poultry Journal.* **16.** 576-578.

This paper was read at the Annual Poultry Conference held at the Harper Adams College.

The author reviews the existing knowledge of the condition known as "fowl paralysis." He believes that the paralytic symptoms exhibited by adult fowls may arise from more than one cause. Some of the theories advanced by different observers are that it is caused by:—(1) a filterable virus; (2) intestinal worms and coccidiosis; (3) deficiency in the phosphorus or calcium content of the blood, and (4) errors in nutrition.

Downham found from observations on infected flocks that the commonest symptoms were emaciation, paralysis of the legs and wings, and, less frequently, blindness. In most of the outbreaks where paralytic symptoms predominated, there has usually been a heavy infection with coccidia. In view of the rapid dissemination of the disease and the heavy losses resulting from it, the author emphasises the urgent need for an immediate investigation on an adequate scale.

T. M. DOYLE.

HAYNES, F. (1931). **Experimental Dust Inhalation in Guinea Pigs.**—*J. Hyg.* **31.** 96-123. 6 figs. [28 refs.]

This paper describes experiments carried out for the Health Advisory Committee of the Safety in Mines Research Board; their object was to determine the effects produced in the lungs by the inhalation of dust of different kinds.

A. LESLIE SHEATHER.

FLOREY, H., & WEBB, R. A. (1931). **Mucous Secretion in acute experimental Inflammation of the Colon and other Mucous Membranes of the Cat; Histological Changes.**—*Brit. J. Exp. Path.* **12.** 286-300. 6 figs. on 3 plates. [8 refs.].

[FLOREY (1930) showed that, in the dog and cat, the excretion of mucus into the gut by the goblet cell is not under nervous control and that it is unjustifiable to assume that mucous colitis is due to nervous excitation. It was further shown that the application of agents (*e.g.* mustard oil), capable of causing cell damage,

resulted in a direct reaction of the goblet cells of the colon with a rapid excretion of mucus.]

This paper deals with the histological changes which occur in the colonic mucosa in this process of excretion; it has application towards understanding of the processes underlying the secretory activity of the goblet cell and inflammatory reactions in the intestine.

Mustard oil, in various dilutions with olive oil, was injected into exposed colonic loops and the animal was left for varying periods up to 20 hours, pieces of the colon being excised at the beginning and end of the experiment for histological examination. The histology of the normal colonic mucosa is described, particular attention being directed to the morphology of the goblet cell.

The mechanism of discharge of the stimulated goblet cell is discussed. Egress of concentrated mucus occurs through the stoma, the nucleus becomes round and the goblet part less and less bellied out. As the mucus is excreted, more of the cytoplasm becomes revealed until the theca and contents are represented by a small amount of concentrated mucus at the surface of the cell. The goblet cell now has the appearance of a columnar epithelial cell. The cells at the bases of the crypts undergo discharge and exhibit their cycle of changes before those nearer the surface. Restoration of the exhausted goblets is rapid and complete; the evidence points towards the process being a restored function of the old mucin-producing cells, although many new cells are also formed.

The mucus-secreting cell of the stomach has different properties in its reaction towards irritation; it was not possible to exhaust it in any way comparable to that which is so effective in the goblet-cell.

J. R. M. INNES.

I. —. (1931). **Cancer Research in Harvard University.**—*Brit. Med. J.* May 16th. 856.

II. —. (1931). **Aspects of the Cancer Problem.**—*Brit. Med. J.* June 27th. 1123.

III. —. (1931). **Carcinogenisis.**—*Lancet.* **220.** 1409-1410.

I. The Cancer Commission of Harvard University are investigating the physiological aspects of the disease, especially regarding inorganic salt metabolism, the relation between the thyroid gland and calcium metabolism and the effect of endocrine preparations in the treatment of tumours. Groups of cases have also been studied to determine the value of radiation in cancer of the breast.

II. This is a broad discussion of the cancer problem with special reference to Professor SHERBER's recent book, "Contributions to the Solution of the Cancer Problem," and to the work of KAMINER and FREUND who have investigated the relationship between desaturation of normal fatty acids and cancer production. Metabolic and chemical changes appear to be important factors influencing cancer formations.

III. In the report of the Yorkshire Council of the British Empire Cancer Campaign, the effect of certain electrolytes on cells, resulting in colloid precipitation, is described as an essential factor in the process of cell division. Work has also been carried out on the action of mustard gas, of blast furnace tar and of low temperature carbonisation tar in carcinogenisis. Lactic acid produced in cancer cells differs in its production from that in muscle cells. Fatty conditions of the skin of rats are found to promote the appearance of a cancer, but no diet relationship has been detected.

NORMAN HOLE.

HORDER, T. (1931). **Observations on the Treatment of Septicæmia.**—*Brit. Med. J.* Oct. 3rd. 593-594.

WILKIE, D. P. D. (1931). **Surgical Aspects of Septicæmia.**—*Ibid.* Oct. 3rd. 594-595.

These papers represent synopses of remarks made at the opening of a joint meeting of the sections of Surgery and Medicine at the annual meeting of the British Medical Association held at Eastbourne.

Horder defines septicæmia in human beings as a general infection associated with multiplying bacteria (usually streptococci or staphlyococci) in the blood. He outlines the various available methods of treatment and shows how far we are from certain success in the matter. Specific treatment includes the use of antisera, vaccines, immuno-transfusions and bacteriophages : chemotherapy is still unreliable though the author is hopeful that a suitable preparation will be found. Protein shock therapy is an unknown quantity ; ordinary blood transfusion is very beneficial in strengthening the patient : general management, diet and nursing are naturally also of great importance.

Wilkie gives some more detailed information from a surgeon's viewpoint. He discusses the indications and contra-indications for surgical interference. He believes in the use of large doses of anti-streptococcal serum in the earliest stages of septicæmia and in giving large quantities of drinking water with alkalis and glucose. He is sceptical about vaccines and protein shock, but considers that sensitised vaccines deserve trial for curative treatment ; he is a strong believer in prophylactic vaccination with *B. coli* and streptococci combined with nuclein injections prior to certain operations associated with the risk of subsequent septicæmia.

J. T. E.

DISEASES RELATED TO NUTRITIONAL AND METABOLIC FACTORS.

VELU, H. (1931). Un Chapitre délaissé de la Pathologie Morocaine : Les Maladies de la nutrition. [**A neglected Chapter in Moroccan Pathology : Nutritional Diseases**].—*Bull. Acad. vét. de France.* **6.** 71-81.

A general review discussing the influence of dietary factors in relation to disease, with special reference to subpathogenic conditions in domesticated animals. Very little personal experimental material is introduced but the paper is of interest as reflecting veterinary opinion in French Africa.

The author points out that although contagious disease plays such an important rôle in Morocco the veterinary administrative authorities are well armed against it. Parasitic diseases are also important but can be controlled by prophylactic treatment and preventive measures. He thinks, however, that the part played by nutritional factors in the causation of disease has been overlooked in the past and that the time has come to put into practice the ideas recently acquired from experimental work on dietary deficiency diseases.

He discusses the avitaminoses, and particularly the influence of vitamin deficiencies on the course of infectious diseases ; suggests the use of vitamins, especially preparations of vitamin A, to eliminate predisposing factors in epizootic diseases of obscure origin.

He discusses deficiencies in respect to calcium, phosphorus, sodium, chlorine, potassium, iron, magnesium, and iodine, and advocates the addition of minerals to the rations of animals in order to rectify " mineral imbalance."

He considers that in Morocco malnutrition plays an important part in morbidity and mortality of stock and that the study of nutrition should figure prominently in any programme of agricultural amelioration. Morocco, he considers, is behind America, England, South Africa and Australia, and requires the organisation of a research laboratory with a specialised staff, in which veterinarians, biologists, chemists and physiologists can coöperate for the prosperity of the stock industry and of agriculture.

H. H. GREEN.

PLATT, R. (1931). **The Blood Glutathione in Disease.**—*Brit. J. Exp. Path.* **12.** 139-143. [6 refs.]

The object of the investigation is the determination of the content of the blood in glutathione [see footnote 1] under various pathological conditions in man.

The method adopted for determination of glutathione in venous blood [note 2] was simple titration of protein-free filtrates with iodine.

The observations cover 12 normal cases, and 44 pathological cases of various types. The conclusions are as follows :—

(1) Normal glutathione content of human blood is about 30 mg. to 50 mg. per 100 c.c., almost exclusively present in the corpuscles.

(2) In the majority of pathological conditions including cystinuria the figure remains within normal limits (nephritis, nephrosis, obesity, gall stones, diabetes, gout and pulmonary tuberculosis). In some cases of liver disease, however, the blood glutathione shows rather wide variations.

(3) In anæmia and some cyanotic states the ratio of glutathione to corpuscles is increased [although in anæmia the total amount may naturally be diminished].

(4) Studies of myelogenous and lymphatic leukæmia show that glutathione is a constituent of both types of white corpuscles. A large amount is also contained in pus cells.

NOTE 1.—Glutathione is a tripeptide of molecular weight 307 [compare HOPKINS, F. G. (1929). *J. Biol. Chem.* **84.** 269]. It is wide-spread in plant and animal tissues, including the red blood cells. It occurs in a reduced form containing a sulphydril group and an oxidised form in which two molecules combine together through their sulphur atoms with loss of two atoms of hydrogen. It can thus play an important part as intermediary in numerous oxidations and reductions in tissues. It is an important component of some " redox " systems [compare this *Bulletin.* **1.** 237].

In blood, glutathione occurs, not in the plasma, but in the formed elements. In the red blood corpuscles it assists in the oxidation and reduction of hæmoglobin. In venous blood it is almost entirely present in the reduced form and hence can be estimated by titration with an oxidising agent.

NOTE 2.—The simple method used by the authors, as sufficiently accurate for clinical purposes, is as follows :—

(1) To 5 c.c. of well mixed oxalated blood, as soon as possible after removal from the animal, add 10 c.c. distilled water.

(2) Directly the corpuscles are laked add 10 c.c. of 20 per cent. trichloracetic acid to precipitate the blood proteins. Mix and filter.

(3) To 10 c.c. of the clear blood filtrate add 2 drops of freshly prepared 2 per cent. solution of soluble starch as indicator, and run in N/1,000 iodine solution to blue end-point from a burette graduated in twentieths of a c.c. The number of c.c. of iodine used multiplied by 15·35 gives the amount of glutathione expressed in mg. per 100 c.c. of original blood.

H. H. GREEN.

BODANSKY, A., & JAFFE, H. L. (1931). **Parathormone dosage and Serum**

Calcium and Phosphorus in experimental Chronic Hyper-parathyroidism leading to Ostitis fibrosa.—*J. Exp. Med.* **53.** 591-604. 4 tables. [14 refs.]

[Generalised *osteitis fibrosa* has been recognised as a specific bone dystrophy since VON RECKLINGHAUSEN (1891) originally described the lesions, but it is only in recent years that any approach has been made towards establishing the etiology. It is now recognised that the disease arises through a functional hyperactivity of the parathyroid. The first important step in this great advance was the isolation by COLLIP of an active parathyroid extract which, on injection, caused a hypercalcæmia and an increased urinary excretion of calcium. The work of MANDL, AUB, HUNTER and TURNBULL led ultimately to the dramatic conclusion that this disease in man, with all its complications of hypercalcæmia, high urinary and fæcal calcium excretion and malacic bones, is due to excessive mobilisation of the calcium from the skeleton, caused by hyperactivity of a neoplastic parathyroid.]

This paper is one of a series in which it is proved that the disease can be produced experimentally in guinea pigs and dogs by overdosage of parathormone, the condition being identical in its clinical and pathological aspect with the disease observed in man.

This particular article deals with attempts to induce a condition of chronic hyperparathyroidism in puppies in order to allow the most definite development of the bone lesions and also to determine the influence of the calcium intake. It was found that doses of parathormone, which were tolerated on a low calcium intake, rapidly proved fatal on a high calcium intake. On the low intake, hypercalcæmia and other symptoms of overdosage did not occur, but these disturbances could be induced by an increase either in the calcium intake or in the daily dose of parathormone. The serum phosphorus in chronic hyperparathyroidism in young puppies continued at, or rose to about, the high level normal for young animals. A single dose of parathormone, given to animals on a liberal calcium intake, caused a more marked relative rise of serum calcium than in normal adult dogs ; later, when the treatment had been continued for some time, this effect was modified, indicating some tolerance due to a certain amount of compensation. Bone lesions presenting the essential features of *osteitis fibrosa*—the severity depending on the relation of the parathormone dose to the calcium intake and to the duration of experiment—were most prominent on low calcium intakes, large doses of parathormone being tolerated without fatal hypercalcæmia.

J. R. M. INNES.

LEVADITI, C., & PO, LI YUAN. (1931). Action calcifiante de l'ergostérol irradié (vitamine D) sur les lésions provoquées par l'injection de Bacilles BCG dans le testicule du lapin. **[The Calcifying Action of Irradiated Ergosterol (Vitamin D) on the Lesions provoked by the Injection of BCG into the Testicle of the Rabbit].**—*C.R. Soc. Biol. Paris.* **107.** 122-127. [2 refs.]

The authors investigated the calcifying action of irradiated ergosterol, administered to rabbits *per os* in doses of 2 mg. and 5 mg. per kilo body-weight, upon the lesions produced by intratesticular inoculation of a virulent strain of *B. tuberculosis* and of the BCG strain. Treatment extended over various periods up to 42 days, (survival up to 57 days) involving total dosages of irradiated ergosterol ranging from 50 mg. to 375 mg. per rabbit.

They conclude that vitamin D (irradiated ergosterol) administered *per os* provokes calcification of the testicular lesions due either to virulent tubercle

bacilli (living or dead) or to bacilli rendered totally avirulent as in the case of BCG.

The degree of calcification appears to be directly related to the strain of *B. tuberculosis* used. The more toxic and casefying the strain the more apt are the induced lesions to undergo calcification under the influence of the ergosterol treatment.

H. H. GREEN.

MOURIQUAND, G., ROLLET, J., & CHAIX, Madame. (1931). Étude biomicroscopique et histologique des lésions cornéennes dans l'avitaminose A : les stades initiaux de la xérophtalmie. [**Biomicroscopical and Histological Studies of the corneal Lesions in Vitamin A Deficiency : the primary Stages of the Xerophthalmia.**—*Bull. d'Histol.* **8.** 72-83. 4 figs. [4 refs.]

The authors of this paper offer evidence to support the view that, in vitamin A deficiency in rats, the inflammatory process occurring in the xerophthalmia is caused by a non-specific infection which is secondary to epithelial dystrophy of the cornea.

Biomicroscopical and histological examination of the cornea show that the initial lesion is an œdematous thickening and, later, opacity of the cornea. Keratinisation, desquamation and ulceration of the surface epithelium follows and, subsequent and contingent to this process, infection ensues. [An adequate supply of vitamin A is necessary to maintain mucous membranes in full physiological activity, one of their functions being to prevent the bacteria which normally inhabit the lumen of the respiratory and alimentary tracts from penetrating into the body. Deficiency of vitamin A causes a metaplastic transformation of the normal columnar epithelium into a stratified type ; the protective function is thus lost and infection follows.]

J. R. M. INNES.

WOLF, A., & PAPPENHEIMER, A. M. (1931). **The Histo-pathology of nutritional Encephalomalacia in Chicks.**—*J. Exp. Med.* **54.** 399-405. 1 table. 13 figs. on 4 plates. [5 refs.]

[PAPPENHEIMER and GŒTTSCH (see this *Bulletin*. **1.** 66) described a disease affecting the central nervous system of chicks apparently caused by an obscure nutritional disorder, the diet used being complete except for vitamin E.]

This paper deals with the histopathology of the lesions in the brain studied by suitable neuro-pathological methods. The salient features were :—(1) œdema and disruption of the cellular fibrillar elements ; (2) degeneration and necrosis of the Purkinje cells and the small cells of the granular layer of the cerebellum ; (3) small hæmorrhages in the cortical white matter, and (4) hyaline capillary thrombi in the necrotic areas.

The primary disturbance is in the cerebellum, the cerebrum and medulla being subsequently involved. The view is taken that the initial lesion is a vascular disturbance followed by reactive multiplication and local increase in the microglia ; there is transformation into compound granular cells, accompanied by endothelial proliferation and vascular ingrowth into the degenerated areas and, finally, there is mesodermal organisation of the softened tissues. A similarity is observed between these lesions and the early cerebellar disturbances in epilepsy ; they are distinct from those observed in vitamin B complex deficiency. Evidence is given to show the functional nature of the condition.

The authors conclude that, whatever the nature of the nutritional error can be, it causes impairment of the capillary circulation in the brain, perhaps in the nature of a vaso-motor paralysis, the essential lesion being an ischæmic necrosis.

J. R. M. INNES.

BAKER, L. H., REID, J. J., & OWEN, M. (1931). **Diabetic Coma of Feed-Lot Sheep.**—*J. Amer. Vet. Med. Ass.* **79.** 97-99.

This condition occurs sometimes in sheep which are being fattened quickly; affected animals die suddenly after a short illness. Symptoms come on without warning; fat sheep start suddenly, jump up and fall over and there is great salivation. Respiration becomes laboured and coma follows; the temperature varies in different individuals. The disease has been observed for the last seven years and differing views have been held as to its causation. *Post-mortem* findings vary considerably and confuse the diagnosis.

The authors examined blood and urine from comatose sheep and found a high hyperglycæmia and sugar in the urine. In one case there were 300 mg. of blood sugar per 100 c.c. and 3·48 per cent. of urine sugar as against normal values of 66 mg. and zero respectively. Attempts to treat the condition with insulin yielded successful results in one case, but in others the sheep passed from a condition of diabetic coma to one of insulin coma. Death followed the use of insulin combined with glucose. Successful prophylaxis is attainable by reducing carbohydrate intake and thereby prolonging the fattening period by one quarter.

J. T. E.

RIES, J. N. (1931). Contribution à la pathologie des dystrophiques de l'espèce Porcine. **[The Pathology of Dystrophias in the Pig].**—*Bull. Acad. vét de France.* **4.** 144-150. 4 figs.

Of a litter of five pigs fed on boiled potatoes, skim milk and maize meal, two developed normally and three were stunted.

One of the animals was in very poor condition; its skin was covered with scabs and it was partly blind and deaf. It always sought sunny places. The injection of irradiated stearin was without effect, and a diet rich in vitamins produced no improvement. Washing with water showed that the scabs were really saponified fatty acids as they readily lathered and no brushing was required to remove them. The crusts reformed in a few days. The urine was icteric and contained large amounts of albumen, but there was no jaundice.

On *post-mortem* examination, the muscles were dropsical and pale yellowish in colour, but all the lymphatic glands were swollen and dark red in colour. The liver was cirrhotic; there was no goitre.

Dissection showed that the alveolus of the unerupted seventh molar was within 4 or 5 mm. of the cranium. On the orbital side the only separation was the *lamina papyracea* which was represented by the wall of the alveolus itself, the maxillary bone having compressed and crushed the ethmoid bone.

A male pig which at five months showed no testicles was very stunted and thin and had very long ears. The animal appeared to be hungry, but was unable to eat properly or even suck although it attempted to do both when food or a teat were offered to it. It was unable to control the direction of its progression. As in the previous case, the animal sought places where there was sunshine. The vitamin-calcium test excluded avitaminosis.

Repeated injections of extract made from fresh thyroid produced marked

improvement in condition, but this was not maintained when the injections were stopped.

No lesions of a general nature were found on *post-mortem* examination, save a dropsical condition of the muscles and enlargement and congestion of the lymphatic glands. There was displacement of the alveolus of the seventh molar as in the previous case, but the bony layer on the orbital side was thicker. There was no hypertrophy of the hypophysis ; the two lobes were well separated and they appeared to be rather firm.

The author adds some notes about a case which has already been reported in part. A two months old sow fed on a maize meal diet showed convulsions after four or five weeks. The animal was thin and stunted, the ears were cyanosed and cold and there was diarrhœa streaked with blood, but the appetite was maintained. The vitamin-calcium test was positive. Rapid recovery followed the administration of a suitable diet. Five months after treatment had been begun, a febrile attack occurred. There was intestinal stasis, abdominal pain and a harsh dry cough, but recovery took place.

A. LESLIE SHEATHER.

JAY, R. (1931). **Feeds in relation to Disease of Swine.**—*Monthly Bull. Dept. Agric. California.* **20.** 533-534.

The author emphasises the importance of proper diet for the growth and health of young pigs, starting from the pre-natal state (diet of sow). Recommendations and warnings about the feeding and management of litters are given and disease conditions which are liable to follow improper diet are enumerated.

J. T. E.

HAMILTON, T. J. (1931). **Pig Anæmia.**—*Vet. Med.* **26.** 206.

The author describes a disease of young pigs that have farrowed early in the breeding season and have been kept on indoors. It occurs between the second and fifth week of life and is characterised by a great fall in the hæmoglobin of the blood ; the affected animals have a lowered resistance to disease. Fast growing litters are more severely affected than average ones and, if the pigs survive through the eighth week, they recover spontaneously. The disease appears to be due to deficiency of iron and copper in the sow's milk as it can be prevented by dosage with these minerals.

Litters allowed to roam freely on land do not become affected.

J. T. E.

DOYLE, L. P. (1931). **Pig Anæmia.**—*Vet. J.* **87.** 430-432.

The author states that, when sows and their litters have access to " blue grass", the occurrence of anæmia is prevented, even if the grass is fed to the animals while they are confined in buildings. Other fresh grasses (green rye, alfalfa and oats) do not have the same protective effect as " blue grass." In controlled experiments, it was found that, when litters were allowed to roam over " blue grass " land, their dams being confined in a small pen on the same land, they never contracted anæmia and their blood had a normal hæmoglobin content ; when litters were confined indoors, however, the hæmoglobin was only one-third of the normal at four weeks of age. Litters of sows which had been allowed access to " blue grass " pasture during gestation and which were confined indoors for eight weeks after parturition also showed resistance to anæmia.

J. T. E.

IMMUNITY.

NICOLAU, S., KOPCIOWSKA, & CONSTANTINESCO, V. (1931). Immunité et virus filtrables. Recherche par l'électrophorèse du virus herpétique dans le névraxe des Lapins immunisés. [**Immunity and Filtrable Viruses. Electrophoresis of herpetic virus in the nerve axis of immunised rabbits**]. —*C.R. Soc. Biol. Paris.* **106.** 1100-1103. [7 refs.]

The authors discuss the view of OLITSKY, RHOADS and LONG [(1929). *J. Exp. Med.* **50.** 263, 273.] which treats the retention of immunity in certain virus diseases as related to the retention of the virus in latent form by the animal. OLITSKY based his conclusions mainly on electrophoresis experiments, in which he successfully dissociated the virus from suitable tissues.

The authors oppose the findings of OLITSKY and co-workers, and adduce negative results from electrophoresis of nervous tissue (suspensions of brain and medulla in saline) of rabbits immunised against herpetic virus. They failed to produce symptoms in rabbits inoculated under the *dura mater* with the gelatinous emulsion collecting round either positive or negative electrode, and so failed to bring to light any latent virus.

Commenting upon these data, M. A. NETTER points out that the failure of the authors to demonstrate survival of the herpetic virus is hardly sufficient to dispose of the positive results of OLITSKY, RHOADS and LONG, on different viruses (poliomyelitic and vaccinal). He points out that active vaccinal virus (cow-pox) can be collected at the positive pole from suspension of skin, testicle and spleen even when inoculation with the same materials before cataphoresis is without effect. In the case of poliomyelitic virus mixed with convalescent serum, the travel is to the negative pole.

NETTER also considers that the experiments of LÉPINE on vaccinal infections establish the dissociation of the virus, although LEVADITI and LÉPINE were unable to demonstrate the virus of poliomyelitis by cataphoresis. He explains the discrepency of the results as probably due to the difference in the constitution of the medium in which electrophoresis occurs, and promises results in collaboration with GIRARD which will clear up sources of error.

H. H. GREEN.

BRIDGES, R. F. (1931). **The Slide-Rule and Agglutination.**—*J. R. Army Med. Corps.* **57.** 13-17. 2 diagrams.

The paper describes the construction of a slide-rule designed to obviate the labour of arithmetical calculations where a large number of agglutination tests has to be carried out. Like most slide-rules it operates upon the principle of logarithmic addition and subtraction replacing arithmetical multiplication and division ; and being 12 inches long by about 2 inches in breadth, it is easy to use.

The rule (varnished wood) has four scales marked from upper to lower edge : Standard Agglutinin Units, Suspension Factor, Degree of Agglutination, and Dilution of Serum. To use the instrument the slide is moved until the degree of agglutination observed in the end-tube is opposite the dilution of serum in that tube. The reduced titre of the serum is then read off opposite the suspension factor of the emulsion.

The rule gives results agreeing to within one per cent. of the more laborious arithmetical calculation, and is therefore good enough for all diagnostic work.

H. H. GREEN.

LOCKE, Arthur, & MAIN, E. R. (1931). **The Relation of Copper and Iron to Production of Toxin and Enzyme Action.**—*J. Infect. Dis.* **48.** 419-435. 7 tables, 1 chart. [31 refs.]

The seat of the activation of every enzymic process must be an inorganic molecule, for only such a molecule could support the strains associated with catalytic action and its reverse.

The olive green colour of highly concentrated preparations of diphtheria toxins is partly due to organic substances and partly due to the presence of the catalytic metals copper and zinc. It is possible to prepare colourless fractions by iso-electric separation. These fractions flocculate with anti-diphtheria serums, but they themselves are not toxic. Toxicity appears to be closely associated with the coloured metallo-organic complex.

Broth ordinarily used for the cultivation of the diphtheria bacillus contains 0·001 to 0·004 mg. of copper and from one-tenth to one-twentieth that amount of iron per c.c. If the copper-iron ratio be reduced to one or less, the number of minimal toxic doses per c.c. of filtrate is reduced to less than one-thirtieth. Liver extract, cysteine, potassium ferrocyanide and iron, when added to the medium in suitable amounts to bring about the necessary alteration in the ratio, produce no significant reduction in growth rate, but the toxicity of the filtrates is very greatly reduced. Amounts of cysteine smaller than those required to change the ratio appear to stimulate the production of toxin.

Broth which has had the available copper reduced by cysteine, produces a filtrate of reduced toxicity, but replacement of the copper in such a broth restores the capacity of the cultures to produce a normal amount of toxin.

The toxin-production in broth which has been reduced by the addition of cysteine is still further depressed by the addition of iron or manganese compounds, but zinc appears to be without effect. The effect produced by treating broth with hydrogen sulphide is parallel with that produced by cysteine.

A toxic filtrate of normal strength is partially neutralised by cysteine. This holds good for both diphtheria toxin and tetanus neurotoxin. Cysteine inhibits, to some extent, the production of tetanus neuro-toxin in cultures. The hæmotoxin of the tetanus bacillus is not inactivated by cysteine.

The production of hæmotoxin by *Cl. welchii* is not influenced by cysteine, sodium cyanide or potassium ferrocyanide. It is inhibited by ferricyanide and stimulated by ferrous iron. The hæmolytic titre of filtrates of *Cl. welchii* hæmotoxin is not reduced by cysteine or cyanide, but contact with cupric iron causes depression of the titre. If the copper ion be removed by cysteine or sodium hydrosulphite, the hæmolysin is restored to its original titre.

A. LESLIE SHEATHER.

FIELD, M. E. (1931). **The Toxicity of certain normal Sera for the Guinea Pig.** —*J. Immunol.* **20.** 89-100. 3 figs. 2 tables. [17 refs.]

A review of the literature reveals a diversity of opinion as to the rapidity with which normal serum of human or animal origin loses its toxicity for the guinea pig. Apparently the hæmolytic power is retained longer than the property of raising the systemic blood pressure, as distinct from the pulmonary arterial pressure, and also longer than the ability to produce skin necrosis.

Realising that any small physiological change might be masked by gross effects, the author selected as a criterion of activity any changes taking place in the pulmonary vessels and bronchioles, these being exceedingly sensitive.

To determine the effect of the age of serum, decerebrated guinea pigs were

put in a plethysmograph and inoculated *via* the exposed jugular vein with serum obtained under aseptic conditions from the human being, rabbit and horse. Contact of the serum with clot before removal or heparinisation made no difference ; serum was shown to produce fatal results when 72 hours old, but not when six days old, although there was evidence that it then produced broncho-constriction. Serum was almost completely innocuous when one week old.

The actual cause of death not being clear, but being variously ascribed to thrombus formation, agglutination and constriction of the pulmonary vessels, the author endeavoured to show by experiment the actual relationship of these factors. The products of hæmolysis, i.e. the cellular extract of hæmolysed, guinea pig red corpuscles, were shown to be toxic for the guinea pig and the rise in pulmonary arterial pressure to be due to the direct action upon the pulmonary vessels and not to any obscure agglutination process. The serum introduced was responsible for great *intra vitam* hæmolysis which decreased in amount as the toxicity of the serum declined.

N. BARRON.

I. LEMÉTAYER, E., & DESHAYES, E. (1931). Teneur en antitoxine du sérum et hyperleucocytose provoquée, chez le cheval, au cours de l'hyperimmunisation antitétanique. [**The Antitoxin Content of the Serum and the Hyperleucocytosis provoked in the Horse by Antitetanic Hyperimmunisation**].—*C.R. Soc. Biol. Paris.* **107.** 1473-1475. [4 refs.]

II. RAMON, G., & LEMÉTAYER, E. (1931). Procédé pour accroitre et rendre plus durable la production des antitoxines chex le cheval. [**Procedure to augment and render Antitoxin Production more lasting in the Horse**].—*Ibid.* **107.** 1476-1479. [3 refs.]

I. Some experiments carried out by the authors, in the course of hyperimmunising horses against tetanus, show that the addition of powdered tapioca to the inocula not only brings about a considerable increase in the white cell blood count, but also results in a greater antitoxin production. The antitoxin content was found to vary directly with the white-cell count. The authors consider that METCHNIKOFF's theory connecting leucocytes with antibody production must be seriously considered.

II. These authors indicate the practical value of combining powdered tapioca or calcium chloride with anatoxin and toxin injections in antitoxic hyperimmunisation. Production is increased, exhausted or naturally poor producers are stimulated and the period of production is prolonged.

NORMAN HOLE.

I. KIRKBRIDE, Mary B., BERTHELSEN, Knud C., & CLARK, Rose F. (1931). **Comparative Studies of Infusion and Infusion-free Diphtheria Toxin in Antitoxin Production and in Standardisation by the Flocculation, Subcutaneous and Intracutaneous Tests.**—*J. Immunol.* **21.** 1-20. 6 tables. 1 chart. [15 refs.]

II. BERTHELSEN, Knud C. (1931). **A Study of the Relationship of Surface Phenomena to the Reaction of Toxin and Antitoxin, with Toxin produced in an Infusion-free Peptone Medium.**—*Ibid.* **21.** 21-41. 6 tables. [40 refs.]

I. The authors favour the use of an infusion-free peptone medium in

routine and experimental work with diphtheria toxin ; it is cheaper and their experiments show that a more uniformly potent toxin-product is obtained. Studies of the flocculation reaction indicate that the " pipette " method is more accurate than the " micrometer syringe " method. Comparing the subcutaneous and the intracutaneous animal tests, it was found that the results of the former tallied more closely with the flocculation results.

II. Using this infusion-free peptone medium, the author has studied the toxin-antitoxin flocculation test from the physical and chemical aspects, especially regarding the relation of flocculation-reaction time to surface tension and the effect of colloidal changes at the toxin-antitoxin inter-surfaces. He concludes that changes in the colloidal state probably resulted in changes in the reaction time and that, the shorter the reaction time, the higher the surface tension.

NORMAN HOLE.

—. (1931). **Serological Test for Cancer.**—*Lancet.* **220.** 1096.

—. (1931). **Cancer Diagnosis by Spectrophotometry.**—*Brit. Med. J.* Aug 1st. 196-197.

—. (1931). **A Diagnostic Test for Cancer.**—*Lancet.* **221.** 264-265.

SMITH, F. C., HOLIDAY, E. R., & MARRACK, J. (1931). **An Investigation into the Spectrophotometric Aspects of the Bendien Test.**—*Lancet.* **221.** 507-508.

The Bendien reaction has attracted wide interest since the book " Specifische Veränderungen des Blutserums, Ein Beitrag zur serologischen Diagnose von Krebs und Tuberkulose " appeared from the Serological Laboratory, Zeist, Holland [BENDIEN, S. G. T., publisher G. Fischer, Jena, 1931. An English translation by Dr. A. PINEY, under the title " Specific Changes in Blood Serum " is announced by Messrs. Heinemann Ltd.].

The book is largely a technical treatise on the physico-chemical state of the proteins of blood serum with special reference to the serological diagnosis of cancer and tuberculosis. The author arrives at the conclusion that under certain pathological conditions a new protein complex appears in the serum which, when precipitated with sodium vanadate and acetic acid under prescribed conditions, and then re-dissolved in sodium bicarbonate, gives characteristic spectroscopic absorption in the ultra-violet region of the photometric range.

The test is carried out by placing twenty different solutions of sodium vanadate and acetic acid, of range from distinctly acid to distinctly alkaline, in a series of numbered test tubes containing equal amounts of serum. With normal human serum flocculation begins in tube No. 6, rises to a maximum in mixtures No. 14 and No. 15, and diminishes to disappearance in No. 20 (the alkaline end). If normal serum is previously heated to 56° C. for half an hour flocculation only begins in tube 7, but in a number of pathological conditions this shift is reversed, i.e. the reaction develops in mixtures lower than, or more acid than, No. 6. This happens with the serum from cases of cancer and tuberculosis, the shift being to No. 5 although somewhat different in the two cases.

In elaborating the test still further the precipitate, if any, formed with No. 5 mixture, is filtered off (by suction) and redissolved in sodium bicarbonate (10 c.c. of 2 per cent. solution for each 0·1 g. wet precipitate), and examined by means of a spectrophotometer [a somewhat expensive instrument requiring experience in use and considerable knowledge of physics for interpretation of data].

The absorption curve is plotted, wave length in Ångström units (Å or hundred-millionth of a centimetre, the unit used to express very short wave lengths) as abscissæ and log e (logarithm of the extinction coefficient) as ordinates. The absorption in the ultra-violet (ultra-visible to the eye but recorded by the photographic plate) is claimed to have a specific character in cases of carcinoma. The curve for cancer shows a rapid fall of absorption at 3,400 Å and a steep rise at an angle of about 50°. The curve for tuberculosis continues to 4,400 Å in the visible spectrum with a slope of about 35°.

The notice " Cancer Diagnosis by Spectrophotometry " in the British Medical Journal records a visit by Dr. A. Piney (secretary of the investigation committee of the British Empire Cancer Campaign) to Dr. Bendien in Holland. Dr. Piney carried 38 tubes of assorted blood serum collected by an independent physician from normal individuals and from patients suffering from cancer and from other diseases such as diabetes and rheumatism. The physician had placed a list of diagnoses in a sealed envelope. Dr. Bendien examined 21 of the specimens, five of which he diagnosed as coming from cases of carcinoma. When his diagnoses were compared with these in the sealed envelope they were found to correspond.

The claim made by Dr. Bendien is that a positive reaction is never obtained in other diseases although every case of carcinoma can not be diagnosed with certainty. Sarcomatous cases are negative.

Although Dr. Bendien himself was originally cautious and emphasised that his serum reaction required much further study, others have hailed the test as diagnostic even in early cases and a somewhat misleading impression has been created through the public press. British medical opinion is, on the whole, sceptical in tone and the *Lancet* article by Smith, Holiday and Marrack (Hale Clinical Laboratory, London Hospital) subjects the test to critical review.

These authors, using the most modern Hilger spectrophotometer, show that the shape of the absorption curve is very easily influenced by extraneous factors. If the solution of the precipitate is allowed to stand a change may occur, even in a few hours, and this change is accelerated by heat and light. They explain the behaviour by assuming that hexavanadic acid is carried down with the protein flocculum in tube 5 (acid medium) but that this changes back to sodium vanadate on standing with the alkaline sodium bicarbonate used to dissolve the precipitate. The extinction coefficient of sodium vanadate is less than that of vanadic acid ; hence the change in the absorption curves.

These three authors maintain that if the test is carried out at once the curves of both cancerous and non-cancerous patients are similar. They conclude that the absorption curves of the dissolved precipitate obtained by Dr. Bendien's method are the same in a variety of diseased conditions, including carcinoma, and that if the absorption is measured at once the curves resemble the tuberculosis curve of Dr. Bendien, changing in process of time to the carcinoma curve. They maintain that the spectrophotometric method applied to Dr. Bendien's solutions has no value in the diagnosis of cancer.

H. H. GREEN.

PUBLIC HEALTH.

Bonansea, Silvio B. (1931). Las eufermedades de la ubre de las vacas en relacion con la produccion de la leche y los peligros para la Salubridad publica. **[The Diseases of the Udder of the Cow in relation to Milk Pro-**

duction and Public Health].—*Revist. Zootech.* **18.** 193-214.

This paper contains nothing original. It is a general brief survey of the udder, its functions and the diseases to which it is liable.

A. LESLIE SHEATHER.

POISONS AND POISONING.

SMITH, M., & HINDLE, E. (1931). **Experiments with the Venom of Laticauda, Pseudechis, and Trimeresurus Species.**—*Trans. Soc. Trop. Med. Hyg. London.* **25.** 115-120. 4 tables. [4 refs.]

The authors point out that, although the potential danger of any poisonous snake depends upon a variety of circumstances, among which the habitat and habits are of great importance, it is impossible to arrive at any definite conclusions concerning the lethality of any particular species without exact information as to the venom yield and degree of toxicity of the venom. They then record their own experiments with the species indicated in the title of the paper.

Their method consisted in " milking " healthy snakes of their venom, drying this, injecting graduated doses intraperitoneally into mice and recording the results. In a few cases the intramuscular or subcutaneous route was employed.

Their results show that the minimum lethal dose of the sea snake *Laticauda columbrina* and of two species of pit vipers *Trimeresurus sumatranus* and *T. waglerii* was approximately 0·113 mg., 0·50 mg., and 2·45 mg. per kilo body weight respectively. In spite of the fact that different animals may vary in susceptibility the total yield of the venom was regarded as too low to render the bites of any of these three species dangerous to man [or the larger domesticated animals].

In regard to the venom of the Australian Black Snake, *Pseudechis porphyriacus* a specimen of virus that had been kept in the dry state for 39 years was found to have maintained its toxic properties without any appreciable diminution in virulence. The lethality of Black Snake venom varies according to the method of administration, intravenous injection being more toxic than subcutaneous.

FAIRLEY [(1929). *Med. J. Australia.* **1.** 296] gives 0·8 mg. per kilo body weight for subcutaneous injection into sheep, while KELLAWAY and THOMSON [(1930). *Austral. J. Exp. Biol. & Med. Sci.* **7.** 125-134] give the corresponding dose for mice as nearer 4 mg. Sheep are apparently more susceptible than mice.

H. H. GREEN.

VELU, H. (1931). Intoxication arsénicale chez la mouton et la chèvre : Considérations sur la pathogenie. [**Arsenical Poisoning in Sheep and Goats : Pathogenic Considerations**].—*Bull. Acad. vét. de France.* **6.** 108-114.

The author records fatalities occurring in connection with the use of the South African " Wire-worm Remedy " (one part arsenite of soda and four parts copper sulphate) administered in the recommended doses of 180 mg. to 625 mg. (according to age of sheep). The South African experience on millions of sheep and the Moroccan experience prior to the accidents, had indicated the remedy as quite safe, and in 1930 the distribution in Morocco amounted to 88 kilos. Astonishment was therefore occasioned in December 1930, when serious arsenical intoxication occurred in several flocks. In one flock 12 out of 55 succumbed, in another 28 out of 300, and in a third 15 (eight ewes and seven lambs) out of 300. In a fourth group of 234 individuals, 22 male goats and 22 female goats

died ; 17 in 12 hours, 13 in 24 hours, 8 in 48 hours, 2 in 3 days, 2 in 5 days, and 2 in 6 days after dosing.

The author discusses the various factors which might have entered into the causation of mortality and records a few experiments to determine the safe dosage. He reviews the findings of the Onderstepoort workers [THEILER, VEGLIA, GREEN, and DIJKMAN. (1918). *5th and 6th*, also *7th and 8th, Reports of the Director of Veterinary Research, Union of S. Africa*], and concurs generally with their experimental results. He then analyses the Moroccan experience, discussing the various possible factors influencing the safety of the standard system of dosage —condition of the powder (fine or coarse, dry or damp), possible errors of dosing, state of health of the animals dosed, individual susceptibility, habituation to arsenic, and nature of the contents of the alimentary tract.

It is upon this last factor that the author lays most stress. After mentioning THEILER's advice to prevent access to water for some time before and after dosing, and to test local conditions by trying the standard doses on a few sheep before dosing the whole flock, he calls special attention to the local conditions in Morocco during the growth of watery spring grass. During this period the rumenal contents of the animals are very fluid and he considers that this favours rapid passage of the arsenic through the abomasum and rapid absorption from the intestine. He concludes that the ordinary safe dose may become dangerous under such conditions, attributes the Moroccan accidents to local conditions rather than to errors in dosing, and advocates further research in this direction.

H. H. GREEN.

SPECIFIC THERAPY.

CORSON, J. F. (1931). **Observations on the Cerebrospinal Fluid in nine Cases of Rhodesian Sleeping Sickness during Treatment with Bayer 205 and Tryparsamide.**—*Ann. Trop. Med. Parasit.* **25.** 189-193.

A record of observations made on natives at Masura in Tanganyika Territory. Dosage of Bayer 205 was 1 g. ; that of tryparsamide 2 to 4 g. at weekly intervals. In one case a total of 50 g. of tryparsamide in seven months had no apparent effect on the cerebrospinal fluid. Of the nine cases four were " relapses."

The author could draw no inferences as to prognosis and treatment from the cell count of the cerebrospinal fluid in his cases. He considers that neither Bayer 205 nor tryparsamide can be regarded as likely to cure advanced cases of Rhodesian sleeping sickness. [For extensive statistical data compare PEARCE, L., 1930, *Monograph No. 23 of Rockefeller Institute*. See this *Bulletin*. **1.** 279.]

H. H. GREEN.

I. CARPENTER, C. D. (1931). **The Use of Nicotin and its Compounds for the Control of Poultry Parasites.**—*J. Amer. Vet. Med. Ass.* **78.** 651-657.

II. CURTIS, D. A. (1931). **Treatment of Turkeys for Parasites.** [Notes from a paper given at a meeting of the Eighth Annual Post-Graduate Short Course for Veterinarians, Michigan State College, East Lansing.] *Vet. Med.* **26.** 281.

III. REBRASSIER, R. E. (1931). **Recent Observations on Internal Parasites of Poultry.**—*Vet. Alumni Quart., Ohio.* **18.** 148-151. 1 table. [4 refs.]

I. In this paper, the use of nicotine products of various kinds is very strongly

urged. A solution of nicotine sulphate, known as "Black Leaf 40," is said to have proved itself superior to copper sulphate for the treatment of stomach worms in sheep without producing the same prolonged after effects. [This is contrary to the findings of some of the most competent workers who have shown that anthelmintic doses of copper sulphate, even when frequently repeated, produce no untoward after-effects.] Tobacco and nicotine compounds are said to have proved remarkably efficient for the expulsion of poultry parasites; in the many tests which the author has carried out, the efficiency of nicotine caseinate is said in no case to have fallen below 99 per cent. A dual purpose remedy both for round worms and tapeworms called by the author a "nicocide" is prepared from a mixture of nicotine alginate and crude kamala and is said to be remarkably efficient. [In the opinion of authorities on this subject, however, the ideal anthelmintic is yet to be found.]

II. A flock of 140 turkeys of a marketable age was found to be suffering from a very heavy infestation with tapeworms. Within an hour after the administration of colloidal iodine, the turkeys began to pass tapeworms and, during the following 22 days each gained between $3\frac{1}{4}$ and $4\frac{3}{4}$ pounds in weight. The laying turkeys and poults were afterwards treated in the same way and similar beneficial results were obtained.

III. This is a short account in popular language of recent observations in the United States on the incidence and life histories of parasitic worms and coccidia. A table is given which shows the intermediate and final hosts of the various tapeworms known to occur there in that country.

E. L. TAYLOR.

PANISSET, L., & GRASSET, E. (1931). Quelques essais avec un composé de l'acridine, La Gonacrine (chloromethylate de diamino-acridine). Fixation par les tissus. Elimination par la mamelle. **[Some Experiments with an Acridine Compound—Gonacrine—Chloromethylate of diamino-acridine. Fixation by the Tissues. Excretion by the Mammary Gland].**—*Bull. Acad. vét. de France.* **4.** 131-143.

There are many mineral and organic substances which can be detected in the milk when they have been ingested, but DECHAVANNE (1909) showed that, only a very small proportion of the substance given actually passes into the milk and that the doses must be large or the administration prolonged to effect even this effect. In 1913, SISLEY and PORCHER published a paper on the excretion of dyes by the mammary gland and, since that date, scarcely anything further has appeared. Generally speaking the mammary gland maintains the production of milk at a constant chemical composition, as very minute traces of foreign substances introduced into the animal's diet are eliminated by way of the milk secretion. The large doses of dyes required to produce any elimination by the mammary gland stain the general tissues of the body intensely. According to SCHUBERT (1929), attempts to treat contagious abortion in cows by means of trypanblue caused staining of the tissues which persisted for about a month, while HUPKA found that an intramuscular injection of 1 g. of that dye in 100 c.c. of water caused staining of the tendons, ligaments, etc., which persisted for five to ten weeks.

The veterinary officers in Algeria have found that trypanblue, in doses of 0·1 to 0·2 g. per 200 or 300 kg., causes such slight staining that it is not recognisable after a fortnight, and that animals so treated can then be slaughtered for meat.

Gonacrine has been used on a considerable scale for septicæmic conditions in the human subject, and particularly for undulant fever. In the course of

investigating its action for the treatment of bovine contagious abortion, the authors have therefore tested the fixation of the dye by the tissues and its passage through the mammary epithelium. Gonacrine is a brown powder which is soluble in water, yielding a yellow fluorescent liquid. It is soluble in glycerin, slightly soluble in alcohol, and practically insoluble in ether and oils. The experiments detailed in the paper were carried out on eight rabbits, four dogs and three cows, and the results indicated that gonacrine cannot be detected in the milk until the dose injected (intravenously) reaches 0·0021 g. per kg. Elimination of the drug through the kidneys stains the urine a greenish colour.

It has been said that repeated injections of gonacrine which have been tried in the treatent of bovine abortion have caused a diminuition in the secretion of milk and a reduction of the fat content, but the laboratory experiments have failed to furnish evidence in support of this view. The doses used were 0·5 g., 1 g. and 1·5 g. at intervals of eight days. There was no recognisable colouration of the tissues a fortnight after the injection of the drug.

A. LESLIE SHEATHER.

I. HALL, M. C. (1931). Letzte Erfahrungen beim Gebrauch von Tetrachlorkohlenstoff. [**Recent Additions to our Knowledge of the Use of Carbon Tetrachloride**].—*Münch. tierärztl. Wschr.* **82.** 53-56.

II. HIRSCHER, H. L. (1931). **Carbon Tetrachloride as a Parasiticide.**—*J. Amer. Vet. Med. Ass.* **79.** 251.

I. Work published by MINOT in 1927 on the toxicity of carbon tetrachloride has important veterinary applications which the author of this paper wishes to bring to the notice of practitioners in veterinary medicine. As a result of the extensive laboratory investigations which have been carried out, we already know more about the pharmacology of carbon tetrachloride than of oil of chenopodium which is a very much older drug. MINOT'S recent discovery that calcium deficiency is a contra-indication for the use of carbon tetrachloride renders it the safest of all anthelmintics.

The history of this discovery is as follows :—MINOT first noticed that some dogs tolerated a much greater dose of carbon tetrachloride per pound body weight than others and traced the cause of the susceptibility to a deficiency of calcium in the diet. Investigation showed that the bilirubin content of the blood of susceptible dogs increased after dosing with carbon tetrachloride, and that symptoms of intoxication appeared when it reached a certain height. It is known that bile pigments combine with calcium in the blood so that greater claims are made on the calcium reserve where there is an increase of bilirubin.

MINOT then tested the effect of an intravenous injection of calcium chloride in dogs suffering from carbon tetrachloride poisoning and found that they recovered in the course of 15 to 20 minutes ; a relapse was not uncommon but by repeating the treatment every three to four hours the dogs were permanently cured. It was also shown that, if calcium salts are added to the food of susceptible dogs for a week or more before the dose of carbon tetrachloride is given, they lose their susceptibility. The administration of calcium salts *per os* was, however, found to be of no value when symptoms of carbon tetrachloride poisoning had already appeared.

In connection with the therapeutic use of calcium chloride given intravenously, the author points out the danger of giving too large a dose ; this may lead to intoxication and even to death. According to recent investigations, a dose of 0·00825 g. of calcium chloride per kg. of body weight is well tolerated by normal

dogs, while jaundiced dogs are able to tolerate twice that amount. The safety of the procedure largely depends upon the time spent over the injection and the dose must not be given more quickly than at the rate of 1 c.c. of a 10 per cent. solution per minute.

From these results it may be learned that an animal which is to be treated with carbon tetrachloride should be fed for at least a week beforehand with food of a high calcium content and, to ensure that an adequate supply of calcium is present, calcium salts, or bone meal may with advantage be mixed with the food. In cases where carbon tetrachloride poisoning has already appeared, calcium chloride must be injected intravenously.

II. A preparation having carbon tetrachloride as the active ingredient has been used with success by this veterinary practitioner for the destruction of fleas and lice on dogs and cats. A sponge saturated in the mixture is rubbed briskly through the coat. No bad effects have been observed, even in small puppies and kittens, and fleas and lice are killed.

E. L. TAYLOR.

PHYSIOLOGY.

GRUZEWSKA, Z., & ROUSSEL, G. (1931). Le cholestérol du sérum de Cheval en fonction des sangnées successives. [**Influence of successive Bleedings on the Serum Cholesterol of the Horse**].—*C.R. Soc. Biol. Paris.* **106.** 1195-1196. One graph.

The authors study the variations in cholesterol content of blood serum of the horse after 35 successive bleedings. A graph is given, showing variations in serum proteins and serum cholesterol, but not recording the magnitude of the bleedings nor the time interval between. The cholesterol curve shows a slight drop after the first bleeding, and a rise after the fourth. This rise above the initial value is maintained (with fluctuations) throughout the later bleedings. The curve for serum proteins is roughly inverse to that for cholesterol.

The authors interpret the behaviour as a defensive mechanism concerned in maintaining the normal osmotic pressure of the blood, and compare their results with FISHBERG's observation on the lipæmia occasioned in rabbits by successive bleedings. Since rise of cholesterol is accompanied by fall of serum proteins the existence of a definite cholesterol-protein complex is regarded as doubtful.

H. H. GREEN.

LINTON, R. G. (1931). **The Calcium and Phosphorus Supply of Dairy Cows.** *Paper presented and circulated at the 49th Ann. Congr. N.V.M.A. (Gt. Britain) [Norwich, Aug. 22nd-28th].* 6 pp. [18 refs.] Discussion (but not paper) published *Vet. Rec.* **11.** 1011-1017.

A general review, the object of which is best given in the author's own concluding paragraphs :—

" To the veterinarian the real matters at issue are the extent to which dairy cows are subjected to calcium and phosphorus deficiency and if the health of the cows and their capacity for breeding healthy calves are being impaired. Estimations have been made of the assumed loss of calcium from the body during a lactation period ; and this has been put as high as 25 per cent. of the total bone reserves, which may or may not be made good during the dry period and when the animals are at grass. It seems almost incredible that a cow could lose one-quarter of the calcium from her bones without exhibiting some clinical

evidence of the fact ; yet we do know that great changes can take place in osseous tissue and remain unsuspected.

" Calcium deficiency has been held responsible for many bovine ills, including retention of the placenta, an increased susceptibility to tuberculosis, abortion and sterility. What evidence is there in support of these contentions ?

" This Conference offers an opportunity for discussing these matters and bringing to the front the much needed clinical evidence of true calcium deficiency in British cattle if such exists."

In reviewing the literature of the subject the author tabulates estimates of the actual calcium and phosphorus requirements of dairy cows, comparing the earlier standards of KELLNER with the views of more recent investigators.

Referring to the work of LITTLE and WRIGHT, and of DRYERRE and GREIG, on milk fever, he is careful to differentiate between hypocalcæmia and acalcicosis, justly remarking that " between the discovery of a serum-calcium deficiency and the establishment of a dietetic cause, there is a gulf yet to be bridged."

The nutritional requirements of the cow for Ca and P, and the requirements for each gallon of milk produced, are discussed in relation to the advisability of feeding mineral supplements.

The possible interplay of vitamin deficiencies, especially in relation to mineral imbalance, is reviewed, and to this the author attaches more significance than do THEILER, GREEN & DU TOIT.

[With reference to the cited work of MCCARRISON on formation of " stone " (urinary calculi) see this *Bulletin*. **1.** 311. For views of THEILER on phosphorus deficiency in relation to osteomalacia and rickets see this *Bulletin*. **1.** 313. A group abstract of 34 papers on mineral metabolism from the Onderstepoort laboratories will be printed in a future issue of this *Bulletin*.]

DISCUSSION.

The discussion indicated a strong interest in veterinary dietetics. Thirteen members took part, the comments of J. STEWART and R. E. MONTGOMERY being of special interest.

STEWART emphasised the difficulty of assigning any definite figure (such as the 20 per cent. of certain authors) for the average assimilation of calcium from feeding stuffs. Too many factors would have to be taken into consideration. Under the most favourable conditions the calcium of milk could be absorbed to the extent of 80 per cent. The figures of HUFFMAN, ROBINSON and WINTER, gave 34·2 per cent. to 57·6 per cent. for an experimental ration of timothy hay, maize silage and grain. Others have shown that a heavy milk producer makes a more efficient utilisation of her food calcium, and that if the calcium supply in a ration is low a relatively higher percentage is absorbed than when abundance is present.

STEWART also pointed out that the ratio between calcium and phosphorus in a diet can vary between fairly wide limits without affecting milk secretion. Quoting the work of HUFFMAN and associates, on the mineral intake deduced from 132 experiments, he contended that too much attention had been paid in the past to the Ca/P ratio [Compare THEILER, GREEN, and DU TOIT (1927). " Minimum Mineral Requirements of Cattle." *J. Agric. Sc.* **17.** 291, also this *Bulletin*. **1.** for discussion of extreme views of MAREK on " Erdalkali-alkalizität "].

Referring to his own work with WOODMAN and BLUNT [(1926). *J. Agric. Sci.* **16.** 205.] STEWART assessed the daily requirements of a four-gallon cow at 70 g. Ca and 41 g. P, and pointed out that most British pastures (perhaps 95 per cent. of the acreage carrying dairy stock) gave much higher quantities. On the field of their 1925 investigations 30 lb. of " pasture dry matter " contained 150 g.

Ca and 62 g. P. In the 1926 investigations the figures were 119 g. Ca. and 65 g. P. Nevertheless some pastures under investigation (hill farms of Northumberland) showed only 32 g. Ca and 17 g. P in 30 lb. dry matter—figures below KELLNER's standard for one gallon of milk.

In regard to stall-fed cows STEWART expressed the opinion that although the supply of calcium and phosphorus might come very near the margin of deficiency it seldom overstepped the borderline, except where roughage was reduced to a minimum and concentrates pushed to the maximum, as in the BOUTFLOUR scheme.

He pointed out that much of the earlier work on the negative calcium balance during lactation was now being revised and quoted HUFFMAN as having kept a 2,000 gallon cow in a state of positive calcium balance on a ration of timothy hay, maize silage and grain.

Referring to the relationship between vitamin D and mineral balance, STEWART advocated care in administration of products designed to supply vitamin, pointing out that very little work has been done on the bovine subject and that data on laboratory animals [white rat chiefly] can not be applied to the ruminant without further ado. There is no proof that cod-liver oil increases calcium assimilation by the dairy cow, while there is considerable evidence that it reduces the fat content of the milk. It is therefore safer and more rational to increase the calcium by mineral supplement (chalk or bone flour) than to resort to the use of a substance such as vitamin D.

R. E. MONTGOMERY, speaking from his experience in the colonies, expressed the opinion that further research was required on the relationship between laboratory criteria of judgment and actual physiological requirements of animals. In British Guiana, for instance, both soil and grass showed a definite deficiency when compared with conventional standards [presumably average British or European pastures] and the cattle showed a marked craving for bones [osteophagia a common symptom of aphosphorosis]. Despite these evidences, however, the animals were in good condition and appeared to subsist normally. Here was an example where laboratory reports might actually discourage stock-raising while field experience indicated that the deficiency was not serious. Were the mineral requirements of cattle less than had been previously supposed, or was there some difference in availability of the minerals in these pastures ?

In the colonies deficiency of minerals gave rise to definite disease conditions and also accounted for much malnutrition and intercurrent indisposition. Deficiencies of phosphorus and calcium were often corrected by a ration of bone meal—would the cattle of East Anglia benefit from such a ration ?

The remarks of the Chairman [T. EATON JONES] referred to the unsatisfactory state of knowledge on the cause of hypocalcæmia in milk-fever, and to the loose statements concerning the control of diseases such as abortion, Johne's disease, tuberculosis, and pseudo-rheumatism (" felon ") by use of preparations of minerals. Loose statements, in absence of proof, might do harm. He pointed out the desirability of the practitioner keeping abreast with dietetic knowledge and advising his clients accordingly.

Professor LINTON replied to the various points raised in the lengthy discussion.

H. H. GREEN.

MILLER, F. R. (1931). **The induced Development and Histogenesis of Plasma Cells.**—*J. Exp. Med.* **54.** 333-347. 2 tables, 8 figs. on 2 plates. [14 refs.]

The name plasma cell, described originally by WALDEYER and UNNA, is given

to a specific type, the characteristics of which include basophilic granular cytoplasm with a clear area near the centre ; the nucleus is eccentric in position, the chromatin being condensed near the nuclear membrane and arranged in radial blocks [cart-wheel arrangement].

The author of this paper studied the histogenesis of these cells in the rabbit by supravital and histological methods, utilising intraperitoneal injections of tuberculo-proteins to stimulate the production. The organs which were the sites of greatest proliferation were the omentum, liver, spleen, cæcum, body wall and scattered lymph nodes. The cells were never observed in the kidneys and seldom in the lungs.

Plasma cells and lymphocytes have certain resemblances, but the plasma cell is derived almost solely in connective tissues from a primitive connective tissue cell and not from the lymphocyte [as generally stated in text books]. It is a definite cellular entity and has a maturation cycle.

As the cell develops, there is a progressive increase in the basophilia of the cytoplasm, the nucleus becomes eccentric and condensation of the chromatin occurs near the nuclear membrane. In the young stage, mitotic division occurs, but in the mature cell the reproduction is amitotic. The morphology is distinct from that of the young lymphocyte. [The function of the cells is obscure.]

J. R. M. INNES.

TECHNIQUE.

KOVÁCS, N. (1931). Ein neuer Weg zur intravenösen Injektion bei Kaninchen. [**A new Intravenous Injection Method for Rabbits**].—*Zlb. Bakt. I.* (*Orig.*) **122.** 287-288. 1 fig.

The lateral ear vein of the rabbit is the easiest vessel for use for intravenous injection, but an alternative site is desirable, when multiple injections or single injections of materials which irritate endothelial tissues have to be made. The author recommends for this purpose the para-umbilical veins which are easily observed and are of a good size ; he first incises the adjacent skin and lays a vein bare by blunt dissection. The veins are long enough to present five or six fresh sites for injections. The need for incision and suturing of the skin detracts, however, from the simplicity of this alternative injection site.

J. T. E.

JENSEN, Claus. (1931). Préparation des lapins destinés à l'intradermoréaction diphthérique. [**The Preparation of Rabbits for the Intradermal Diphtheria Reaction**].—*C.R. Soc. Biol. Paris.* **107.** 337-340. [3 refs.].

The need for an easy and accurate method of titrating the sera of persons inoculated with diphtheria anatoxin led the author to evolve the following technique :—healthy, white, male rabbits, nine to twelve months old, are quarantined in isolation for four to six weeks, during which time they are well fed and weighed every two or three days. Only those which have increased in weight from 1,800-2,500 or 3,000 g. are used. The hair over the back and sides is clipped and the area depilated with a paste containing barium sulphide, zinc oxide and starch. The animal is then bathed in warm water and, after zinc ointment has been applied to the area, is placed in a moderately heated room.

It is watched for loss in weight for three to four days and the Schick test is then applied. If the result is positive, the area is cleaned with benzine and 60-120

squares are marked out, using a mixture composed of lamp-black 2 g., bronze dye 20 g. and benzine 0·3 g.

R. S. ROBERTS.

MISCELLANEOUS.

SEDDON, H. R. (1931). **The Position of Veterinary Science in Australia and Abroad.**—*Austral. Vet. J.* **7.** 83-93. [Presidential address delivered before the General Meeting of the Australian Veterinary Association, May, 1931].

" I have set myself to answer three questions : Firstly, what is the attitude of veterinarians in other countries in regard to the scope of the veterinary profession ; secondly, is that attitude reflected in their training, their ability and their position in the community ; and, thirdly, does their attitude or outlook differ from ours ? "

Apart from teaching, veterinary work can be divided into (1) the control of disease ; (2) the control of the meat and milk supplies and (3) work usually dealt with by the practitioner. It is desirable that the practitioner should adjust the range of his activities, that he should abandon to some extent the commonly restricted sphere, based on the treatment of individual animals, and deal with animal welfare in the mass, at the same time undertaking a lot of the detailed work involved in the operations of the state veterinarian—the taking of samples, vaccination, testing, etc. The practitioner must, however, possess a really scientific outlook and be well equipped mentally, if he is to justify his existence in the machinery. State assistance should be available for the development of scientific medicine and surgery ; the older, crude, unscientific methods must be replaced by methods based on a sound knowledge of the sciences involved. The rest of the organisation must be equally efficient. This postulates the existence of well-equipped and well-staffed schools and adequate research facilities.

The speaker emphasised the necessity for veterinary education to be undertaken by universities. He pointed out the neglect of state aid for veterinary education and research in Great Britain as compared with other countries and the results which have followed this neglect.

The means for expansion in the training of undergraduates and graduates are, however, growing rapidly. The Australian organisations must develop and maintain their position in this progress. Veterinarians must take a larger share in the development and organisation of animal husbandry.

" Veterinary Science has attained a relatively higher development in those countries where the State affords the greatest help and, conversely, where veterinary schools have not been state institutions and there is relatively a lack of aid by the State, veterinary science has not progressed to the same extent."

The speaker answered the three questions posed at the beginning of his speech in the following terms :—

1. In the foremost countries, all subjects relating to animal health, which the veterinarian by his training and experience is in a position to deal with, are regarded as being within the scope of the veterinary profession. Collaboration with other scientists should be encouraged, e.g. where specialised knowledge of such subjects as chemistry, biology, physics, etc., will assist investigations.

2. Where veterinarians have been able to demonstrate that they are qualified to undertake the work involved in this definition of the veterinary sphere, confidence to take the responsibilities and confidence on the part of the public have developed.

3. The outlook in Australia is as progressive as it is elsewhere. The efficiency

of the schools, of the institutions and of the individuals will bear comparison with those to be encountered in any country.

W. A. P.

WIRTH, D. (1930). Sammelreferat Veterinärmedizin 1929. [**Veterinary Hæmatological Review for 1929**].—*Folia hæmat.* **43.** 262-272. [156 refs.]

TECHNIQUE.—KOZMA's work on the enumeration of leucocytes and blood platelets in fowl blood is valuable. He used the counting chamber and diluted stained blood. The details are given in this review. PRESTON also improved the method for examining the red blood corpuscles of fowls.

MEYER contributed to the technique of enumeration and differentiation of equine blood cells. WALSEM advocates the nostril, after it has been made hyperæmic, as the site for taking blood samples in the horse.

ROSENBERG and his co-workers obtained useful results in the estimation of the total blood in dogs by a method employing the intravenous injection of congo red along with blood previously drawn.

Work on blood coagulation was done by HAAG. He estimated the coagulation rate of the blood of the horse as 8·5 mins., of the ox as 4·5 mins., of the sheep as 4 mins., of the pig as 2·3 mins., and of the pigeon as 22·5 mins. KUHAR obtained different results with longer periods, using BÜRKER's method. RIOU found that the coagulation rate in dogs fell 1½ hours after injection of hypophysis extract and that the effect only lasted for 1½ hours. STUBER & LANGER consider that the coagulation rate depends on the fluorine content of the blood. The guttadiaphot diagnostic method was tested by WEHLTE with very variable results so that its value in veterinary medicine was considered to be doubtful.

GAUBERT studied red blood cell sedimentation in the horse ; he found that the rate was faster in mares than in geldings. Several workers studied the normal blood picture of the bovine, horse, dromedary, camel, cat, monkey, rabbit and fowl. Wirth states that normal milk contains 36 per cent. of leucocytes, 44 per cent. of polymorphs, 3 per cent. of eosinophils and 17 per cent. of mononuclear granulocytes. Colostrum contains 75 per cent. of polymorph neutrophiles and 10 per cent. lymphocytes.

CLINICAL HÆMATOLOGY.—OPPERMANN instituted a liver puncture method for obtaining liver tissue for examination in cases of suspected equine infectious anæmia. SCHERMER considers that the pathogenesis of this disease is still obscure.

STIEGER found that iron therapy assists blood regeneration after hæmorrhagic anæmia in dogs. Other workers studied the bone marrow changes after hæmorrhage. It was found that, if blood was drawn in amounts of 10 c.c. from dogs and replaced by an equal volume of Ringer's solution, at 10 minute intervals, death occurred when 77 per cent. of the total erythrocytes had been removed. Other experiments of a similar nature on blood transfusion are also referred to.

Some papers on infectious leukæmia of poultry were written during the year ; there was considerable variation in the opinions of the different authors. Different workers considered that " Dürener Krankheit " is due to hydrocyanic acid poisoning (derived from *Phaseolus lunatus*) and to the removal of important lipoids from soya bean meal by trichlorethylene used as a solvent.

HJÄRRE reported further work on puerperal hæmoglobinuria of cattle ; the exact cause is not yet understood. SCHALK and RODERICK in America reported a hæmorrhagic diathesis apparently caused by the ingestion of sweet clover hay ; in this condition the coagulability of the blood is adversely affected.

BOLNAT expressed the opinion that in equine hæmoglobinuria the chief pathological changes occur in the blood itself [see CARLSTRÖM, this *Bulletin*. **1.** 234.] Another worker is said to have produced a similar condition in a pig by feeding it on oats and distilled water. Its pathogenesis was not discovered.

ZIEGLER and HERRMANN attributed the splashing of pork (multiple muscle hæmorrhages) occurring at slaughter to trauma of the nervous system caused by stunning, the actual condition being a capillary diapedesis.

Three blood groups were found to be present in each of the species, cattle, sheep, goats, swine and fowls. No normal iso-agglutination was demonstrable with rabbit blood.

Only a few papers on the hæmatology of animal diseases were published : they refer to it in relation to swine fever, distomatosis, microfilariasis in cattle, fowl piroplasmosis, canine bartonella anæmia and avitaminoses. Various workers found that ultra-violet rays cause a leucocytosis in normal blood.

J. T. E.

GREENWOOD, M. (1931). **On the Statistical Measure of Infectiousness.**—*J. Hyg. Camb.* **31.** 336-351. 6 tables. [5 refs.]

A discussion on the problem of analysing infectious diseases, treated from the biometric point of view. The mathematical details, involving theories of probability as applied to disease incidence, require a high standard of mathematical knowledge, but those specially concerned with veterinary epizootiology would find the paper stimulating.

Without attempting to abstract the technique of calculation, the gist of the paper may be indicated as follows :—

(1) In common parlance some diseases are more " catching " than others. Complaints such as measles, mumps, whooping-cough and scarlet fever are recognised (roughly in that order) as spreading by contact, but when influenza and the common cold are considered it is at once felt that other factors, besides mere proximity to a sick person, determine the spread. Again, in passing to a disease such as gonorrhœa the idea of contagion is at once limited to a particular mode of contact and the disease is no longer treated as " catching " in the same sense as measles.

An illness is usually said to be infectious when it has been possible to explain the existence of a case of it by close association with an immediately pre-existing case, and the notion of " more or less infectiousness " depends upon some appraisement of the proportion of persons attacked to persons exposed to risk of attack.

(2) When complaints such as measles are considered, rough criteria are sufficient, but when a deeper knowledge is wanted of the epidemiology of diseases in which the degree of infectiousness is uncertain, rough criteria are useless and statistical analysis (however unpopular) becomes imperative. It is here that pitfalls beset the unwary and some knowledge of the mathematics of probability is important. Study of " multiple " cases of disease in groups, and conclusions based upon frequency of distribution of cases, require great care in interpretation.

(3) The general difficulty lies in securing sufficiently accurate data and the majority of published records of multiple cases omit particulars essential for proper deduction. It is obviously futile to apply elaborate calculations to records of cases which omit any appraisement of the characteristics (age, sex, previous history) of the members constituting the groups.

(4) Given the required data, however, the general problem becomes :—N groups have been observed over time T, and at the close of observation N_0 of the groups have recorded no case, N_1 recorded one case, N_2 two cases, ... N_r have recorded r cases ; what light does the form of this distribution throw upon the etiology of the cases ?

(5) The problems discussed by the author fall into two classes, one in which the number of cases within a group may exceed the number of persons constituting the size of group considered, and the other in which it may not. To the former class belong such problems as " cancer houses " where the number of cases may exceed the number of inhabitants at any given instant, since the record may cover some generations of inhabitants ; or such problems as distribution of non-fatal accidents amongst employees, since one employee may sustain many accidents. To the second class belong the distribution of cases of measles, scarlet fever and similar infectious diseases, in groups (families, houses) when T, the period of observation, is short.

The scientific discussion of problems of the first class (upper limit of incidence exceeding actual number of persons) was begun in 1911-12 by MAYNARD and TROUP and by PEARSON. Discussing cancer houses, PEARSON showed that in comparing observed distribution with that required by the hypothesis of " random distribution in houses," the comparison must include the frequency of houses with no infection.

In 1920, GREENWOOD and YULE [*J. Roy. Stat. Soc.* **83.** 255-270] compared " subjects exposed to risk " to " targets subjected to bombardment," the time of bombardment T being divided into intervals so short that (within each) not more than one hit could be registered on a target. On this hypothesis of chance, the distribution of 0, 1, 2, 3, etc., cases at the end of time T is given by the Poisson limit to the binomial with parameter n/N. This method is eminently suitable for statistical work if the individuals (in an accident distribution) or groups be supposed to present *a priori* differences of accessibility to bombardment, and that the *a priori* distribution is continuous and of skew binomial type (Pearson's Type 3).

(6) As illustration a character may be taken, distributed with constant chance $p + q = 1$, through groups m and $k\,m$ respectively. The proportions of persons affected would naturally be identical, p in each series. But the ratios of marked persons, to the number of members of groups of which at least one member (of each) was marked, would not be identical. In other words the *attack rate* would decrease as the size of the group increased. For instance, suppose some disease were not really infectious at all but fell at random in 10 per cent. of a population, and that statistics were compiled of families of one, two and five children, all the families having at least one affected member. The attack rate in families of one would obviously be 100 per cent. in families of two would be 52·6 per cent., and in families of five 24·4 per cent. The point is a simple one, but the author observes that some arguments upon the influence of over-crowding on mortality have been weakened by failing to notice it.

(7) The type of problem in which there are m individuals in each group and the number of cases cannot exceed m, with observations restricted to groups which contain at least one affected individual, is much the most important for the epidemiologist. In this case the author thinks that the deductive method of " imagining a way of happening," expressing that mode quantitatively and comparing its consequences with the observed facts, is generally a more profitable course than the more usual inductive method popular in English statistical procedure.

(8) Formulæ are then applied to the biological interpretation of data on frequency distributions of diseases. Table 1 deals with "History of Children aged under 10 years exposed to a case of measles in the same house during 1926 in St. Pancras." The problem is first handled as if measles were not known to be an infectious disease, but as if the houses concerned were indeed exposed to some unknown special risk. Table 2 gives the computed distribution calculated on the simple binomial and this does not agree with the observed number of multiple cases. The problem is then treated from the other extreme and all the cases after the first are considered as if they were due exclusively to personal infection. Table 3 gives the frequencies of secondary cases compared with "chain binomials" and in Table 4 the same principle is applied to similar cases more stringently selected. The agreement between fact and fancy is statistically respectable, thus justifying the device used for interpretation.

Table 5 supplies a set of values for m up to 5, and p 0·1 to 0·9, useful for purposes of rough estimation.

Table 6 is taken from the *Ministry of Health Report on the Pandemic of Influenza*, 1918-19, and the author, assuming that it refers to families of five, shows that on that occasion influenza behaved rather like measles in its domestic evolution.

The object of the paper, however, was not to discuss epidemiological results on meagre data, but to draw attention to a statistical method. From that point of view it will interest those concerned with statistical analyses of disease incidence, veterinary as well as medical.

H. H. GREEN.

RUSSELL, E. J. (1931). **The changing Outlook in Agriculture.**—*Presidential Address, Section M., Brit. Assoc. Adv. Sc.*

An address of 22 pages surveying the outlook in agriculture as it has changed over the 150 years preceding the centenary meeting of the British Association in London in September, 1931.

The nature of the address unravelling, as it does, the interplay of science, economics, education, and agricultural custom, renders a representative abstract impossible, but a few points of special interest to readers of the *Veterinary Bulletin* may be reviewed.

A century ago the dominant factor in agricultural production was the cost of labour. Today it is science, in particular engineering, biology, and chemistry. At the moment one of the most important factors is the control of disease, and this involves branches of biology unborn at the time when the fresh orientation of national life commenced a century ago (Reform Bill, 1832). Plant pathology and veterinary science play a rôle of ever-increasing significance. In the United States in 1926, two virus diseases reduced the crop of potatoes by no less than 16 million bushels. Sugar beet was so seriously imperilled by curly-top disease that the Government set aside $300,000 for its investigation. In Britain, 5½ million sterling has been paid out, over the last 12 years, in compensation alone, for animals compulsorily slaughtered in the campaign against foot and mouth disease, while the farmers themselves have suffered vastly more.

In Britain, veterinary research is now developing at Cambridge, Weybridge, and elsewhere [London, Liverpool, Edinburgh and, on a small scale, at one or two other centres] while nutritional aspects of disease are also studied at the Rowett Institute at Aberdeen.

Amongst other changes in agricultural outlook the author refers to the develop-

ment of veterinary science in South Africa under the leadership of A. THEILER, and his successor P. J. DU TOIT. In 1895 rinderpest wiped out almost the entire cattle population of certain provinces. Horse-sickness, blue-tongue of sheep, heart-water and numerous other diseases, devastated the developing country. "With almost uncanny precision," says the author, "diseases were diagnosed and measures of control discovered."

"But," he adds in later reference to the problem of disease eradication as a whole, "we are still far from security." The control achieved over nature is indeed wonderful but "our tenure is uncertain and our margin of safety very exiguous."

In surveying the broader changes in agriculture the author brings science into the picture at the beginning of the last century, with the lectures of Sir Humphrey DAVY (1802-1812), the plot experiments of DAUBENY (1834), and the epoch-making book of LIEBIG, *Chemistry in its relation to Agriculture and Physiology* (1840). The collaboration of GILBERT with LAWES, when the former accepted a barn as chemical laboratory in 1843, led to the development of the Rothamsted Research Station as it is known today.

Science (chemistry, botany, agriculture) inaugurated the golden age of British agriculture (1860-1874) by increasing yield per acre (on the assumption of abundant man-power), but science (engineering and economics) again dispelled it by increasing output per man in countries over-sea. The mechanised technique of American farming, backed by an admirable system of agricultural education and improved transport facilities, introduced a severity of competition which Britain found difficult to withstand.

Britain attempted to meet the competition by greater specialisation, especially in products upon which freight was most significant and fresh quality most important, and just before the outbreak of war, within 20 years of the depression of the 'nineties, British agriculture seemed again on the way to prosperity (rising land values). But after the artificial post-war boom culminating in 1920 (wheat at 80/- per quarter), the world break in commodity prices (1922) showed that scientific research had given man a power of production far in excess of his power of consumption. World "food production capacity" had increased at a greater rate than world "food purchasing capacity" so that disequilibrium ensued between "agricultural prices" and the "general price level," depressing agriculture in relation to newer industries. Although science had cheapened production it had not tempered competition.

In Canada, the biologists (Dominion Experimental Farm set up in 1886) bred new varieties of wheat (ripening in 100 days) which pushed the wheat belt into the regions of shorter summers formerly counted as waste. The internal combustion engine solved the problem of man power, conversion of atmospheric nitrogen into fertiliser solved the chief manurial problem.

In Australia, research took the direction of pushing crops into the more arid regions, and over the last 40 years the "wheat produced per inch of rainfall" has doubled.

In New Zealand, the greatest force has been the engineer. In 1873, HARRISON of Australia exhibited his invention of refrigeration; in 1882, the first satisfactory cargo of frozen meat reached London by sailing vessel; in 1929, produce to the value of £30,000,000 travelled from New Zealand by refrigeration transport—and this despite the long distance from market and the higher wage per man (though not per job).

In India, the triumphs of the irrigation engineer have banished even the memory of famine from the land, and provided acres for millions of peasants who would otherwise have none.

To-day the outlook for Empire fruit-growing is also a power of production increasing faster than the purchasing power of consuming markets.

In regard to the position of British agriculture in the face of world competition, the author discusses the factors involved in the agricultural situation—production, scientific advisory and technical system, and marketing. He considers that the next great step forward should be to organise production and marketing on a contract basis, so as to satisfy the known needs of the country with a reasonable margin of safety but without the terrible waste involved in those large excesses which injure the producer without benefiting the consumer.

H. H. GREEN.

BOYD, A. G. (1931). **Review of Some Livestock Regulatory Activities in California.**—*Monthly Bull. Dept. Agric. California.* **20.** 491-514.

The author gives a description of the past history and present state of the Division of Animal Industry in California. It now consists of a Chief (Dr. J. J. KING), Assistant Chief, Chief of the Bureau of Tuberculosis Control (Dr. M. E. MCDONALD), seven supervising veterinary inspectors, 32 veterinary livestock inspectors, three livestock pathologists, a supervisor of poultry disease control and laboratory assistants, etc. The division is concerned with the eradication of disease, inspection and quarantine of imported animals and with disease investigations.

Tuberculosis is attacked by the Pure Milk Law, by the Accredited Herd and County Plan, by calf segregation and by control of the distribution and use of tuberculin. Other diseases included in the scheme are anthrax, scabies, glanders, "Texas fever," swine fever, blackleg, infectious bovine abortion and various parasitic infestations.

Poultry diseases are given much attention; there are three laboratories for poultry disease diagnosis and investigation and also a system of sanitary control of birds. Investigations on poisonous plants are undertaken.

As an instance of what an adequate state veterinary service can accomplish, the author gives an interesting historical account of "Texas fever", sheep and cattle scabies, glanders, foot and mouth disease and bovine tuberculosis in California. Cattle ticks and sheep and cattle mange mites have been completely eradicated; glanders is practically extinct (one case only in 1930) and foot and mouth disease is under control: there was an outbreak in 1929, but this was quickly suppressed with little loss. Tuberculosis is being reduced by means of the schemes mentioned above.

J. T. E.

UNITED STATES. (1931). **Monthly Bulletin of the Department of Agriculture. State of California. 20.** No. 8.

This number of the Bulletin is specially devoted to certain phases of livestock disease control as conducted by the department of agriculture. It contains 18 papers of veterinary interest many of which are dealt with separately in this *Bulletin*. They concern the eradication of bovine tuberculosis and contagious abortion, also sheep diseases, distomatosis, poultry parasites, fowl pox and bacillary white diarrhœa, whorled milkweed poisoning in fowls, and various general activities of the department. A note appears on the recently enacted California Meat Inspection Law which regulates meat inspection throughout the State. Another new act, the Bovine Tuberculosis Law, was also passed

recently: it functions in harmony with the federal laws [presumably on the Accredited Herd Plan]. Under another new act county supervisors have power to appropriate money for use in investigations into animal disease (at present chiefly for poultry diseases). Veterinary surgeons in California have to pay an annual fee of five dollars. All manufacturers of biological products sold in California must be licensed by the U.S. Department of Agriculture. Dr. J. J. King is in charge of the Division of Animal Industry and Dr. Th. Boyer is chief of the Bureau of Dairy Control within the Division.

J. T. E.

REPORTS.

Dominion of Canada. (1931). **Thirteenth Annual Report of the National Research Council.** Ottawa, Canada. 151 pp.

The Honorary Advisory Council for Scientific & Industrial Research, now called the National Research Council, was established in 1916. Laboratory facilities were then available only at the Universities and the work of the Council was greatly handicapped by the inadequacy of such facilities.

The work undertaken is carried out chiefly through Laboratory Divisions, each under a director—physics, chemistry, biology and agriculture, research information and others—and through 24 associate committees and five special committees.

National Research Laboratories consisting of a four-storey building, approximately 418 ft. long, 176 ft. wide and 60 ft. high, will be ready at Ottawa by the end of 1931.

Finances.—Out of an income of $464,382, $220,442 were disbursed as grants in aid of research; $49,990 for post-graduate research fellowships; $21,065 for the laboratory; $16,092 for publication; $18,092 in general administration; $23,334 in travelling expenses; $30,202 on the National Research Library and $83,419 on salaries and honoraria. So far, the Council's outside activities still account for its chief items of expenditure.

Associate Committees.—Of the 24, those on tuberculosis, leather, wool and on weed control are of interest to this branch of science.

Tuberculosis.—Five universities, the Dominion Department of Agriculture and two other bodies are coöperating in the work of the Tuberculosis Committee. Methods of control are studied, attention being given to control by the destruction of diseased animals and to control by immunisation with BCG vaccine. Watson is studying the vaccine at the Hull Research Station of the Dominion Department of Agriculture. In the course of surveying the incidence of tuberculosis in Indians at Fort Qu'Appelle Sanatorium, 7 per cent. of the cattle in one Indian reserve and 2·8 per cent. in another reserve were found to be affected.

The function of humoral antibodies in tuberculosis is being studied at the Queen Alexandra Sanatorium. Types of the antibodies are being isolated; they are being administered to healthy and to affected animals in as pure a state as possible and in high concentration in order that observations may be made on the biological effects produced.

Dissociation of BCG cultures from four sources is being studied at Queen's University. Those obtained from three sources have shown only rough, avirulent colonies, but the strain supplied by Petroff showed both the rough and smooth types of colony and the latter were virulent for guinea pigs. By repeated subcultivation on special media, rough colonies were converted into the smooth type.

The stimulation or retardation of the growth of tubercle bacilli by particular chemicals was also studied. Ferric iron had a stimulating effect, but ferrous iron had not. Strong oxidising agents, like potassium permanganate and potassium chromate, greatly stimulate growth and reducing agents, such as sodium thiosulphate, retard growth.

RANKIN, in Alberta University, has studied the effect of BCG on calves when administered *per os*. New-born calves were purchased ; 38 were treated and 38 were left as controls. Both vaccinated and unvaccinated animals were divided into two groups : one group of each was kept as free as possible from all sources of infection ; the other two groups were first kept free from infection for six months and then placed in contact with tuberculous animals and fed on tuberculous milk for six months. They were then removed from sources of infection and all the animals will ultimately be slaughtered and examined. Observations on the vaccine are also in progress in three herds.

BAUDOUIN, in Montreal University, is using BCG vaccine on new-born babies. " The fact that no reaction has ever been observed following the administration of the vaccine may be taken as evidence of its harmlessness."

The danger of milk infected with *B. tuberculosis* has been studied at Toronto University. Pasteurisation of milk has been compulsory in Toronto since 1915, and the only infections of children in Toronto with the bovine type of bacillus have occurred in individuals who had been infected from milk obtained elsewhere.

The explanation of the occurrence of so-called " no lesion " cattle which have reacted to the tuberculin test has been given attention.

ASSOCIATE COMMITTEE ON LEATHER.—Among other questions, damage resulting from warble flies and from branding is discussed.

SPECIAL COMMITTEES & CONFERENCES.

EXECUTIVE COMMITTEE ON FIFTH PACIFIC SCIENCE CONGRESS.—" Pacific Congresses are held at intervals of not less than three years ' to initiate and promote coöperation in the study of scientific problems relating to the Pacific region, more particularly those affecting the prosperity and well-being of Pacific peoples,' and ' to strengthen the bonds of peace by promoting a feeling of brotherhood among the scientists of all Pacific countries.' "

" The next congress will be held in Canada in 1932. The National Research Council of Canada has been appointed by the Dominion Government to organise and direct all arrangements for the Fifth Pacific Science Congress. Since Canada's scientific interests in the Pacific are largely confined to problems affecting the Province of British Columbia, the congress sessions will be held in the cities of Victoria and Vancouver.

" Following the practice in previous congresses, it has been agreed to group the scientific studies in two main divisions. Biological sciences will include agriculture, anthropology and ethnology, animal diseases, botany and plant pathology, entomology, fisheries, forestry, public health and zoology. Physical sciences include astronomy, geodesy and geography, geology and mineral resources, oceanography, meteorology and terrestrial magnetism, radio, and seismology and volcanology.

CONFERENCE ON ANIMAL DISEASES.—" This conference was held in Ottawa in February, 1930, under the chairmanship of Dr. H. M. Tory. It was called, as stated by the chairman, in order that general consideration might be given to the whole question of animal diseases, and that the Council might be advised by specialists in animal pathology as to those diseases which most urgently required investigation. The Council had in the past supported several researches on animal diseases, in addition to its heavy program of work on tuberculosis, but an increasing number of applications for assistance was being received, and it was desirable that a brief survey be made of the whole field, both to insure that all major problems were receiving attention and in order to avoid duplication of effort.

" Those present, who included representatives of Dominion and Provincial research organisations, veterinary colleges and the universities, as well as several specialists in human pathology, were asked by the chairman to outline the situation in their own particular districts, indicating those diseases which they considered of major significance.

" It was agreed that of the diseases of cattle those affecting the reproductive processes were the source of the greatest losses. Amongst these the Ontario Research Foundation

was investigating the problem of contagious abortion, which also has some relation to human disease. In view, however, of the little exact knowledge possessed about this and other reproductive diseases it was recommended that a survey be made to determine the extent and nature of the loss from these causes.

"Mastitis of cows, investigations on which were being made at the Oka Agricultural College, with financial assistance from the National Research Council, was also classed as a serious disease, and it was considered that a small technical committee should be appointed to report upon it. Red water of cattle was stated to be very prevalent in certain districts of British Columbia, and was also found, though perhaps in modified form, in other provinces. Some work had been done on this problem by Dr. HADWEN, but a further study was urged. Other diseases of cattle discussed were malignant catarrh, hæmorrhagic septicemia and sweet-clover disease. Measures were also discussed for the control of the warble fly, which causes very severe damage to hides and results in reduced milk production.

"Swamp fever of horses was stated to be a disease of particular concern to Alberta and Saskatchewan. Losses were also experienced from botulism, horse cholera and hypertrophic cirrhosis of the liver.

"It was believed that the principal losses in sheep raising were due to various internal parasites, of which special mention was made of stomach and tape worms. Septic pneumonia was also noted as of some significance.

"Swine in Alberta and Saskatchewan were stated to suffer considerably from the plague. Another disease causing concern, especially in Ontario, was anæmia of sucking pigs. Influenza and parasites were very prevalent.

"Poultry diseases were regarded as of particular concern in British Columbia, where Dr. Hill, with assistance from the Council, has already investigated bacillary white diarrhœa. Fowl paralysis was very prevalent, and an investigation was recommended. Losses were experienced from infectious bronchitis, cholera and tuberculosis.

"Dr. Talbot reported that ruffed grouse were dying in large numbers in Alberta from an unknown cause. Encephalitis in foxes also received consideration.

"Two general questions were given special consideration by the committee, that of mineral deficiency in nutrition, which it was thought might have some relation to diseases commonly ascribed to other causes, and animal parasites, upon which a large investigation, with assistance from the National Research Council and the Empire Marketing Board, had been suggested at Macdonald College. This latter was considered to be a matter of such importance that it was decided to call a special meeting of a sub-committee to deal with it."

SUMMARIES OF REPORTS ON ASSISTED RESEARCHES.

THE MEASUREMENT OF CELL SIZES BY THE COMBINED USE OF PHOTO-ELECTRIC CELL & PROJECTION MICROSCOPE.—SAVAGE, in the University of Manitoba, is investigating this question. The combined application of a projection microscope, a red dye and a photo-electric cell insensitive to red light, as a rapid means for obtaining the area of irregularly shaped red blood corpuscles of individuals affected with anæmia has been studied.

GLUCOSIDES OF PLANTS OF WESTERN CANADA.—CAMERON, in the University of Manitoba is responsible for work on this question.

INTERNAL PARASITES OF POULTRY.—The work is carried out under the direction of BAKER at the Macdonald College, Quebec.

POST-GRADUATE RESEARCH SCHOLARSHIPS.—About $50,000 are now spent annually on post-graduate scholarships, which are of four classes :—bursaries, studentships, fellowships and travelling fellowships, of an annual value of $750, $1,000, $1,200 and $1,500 each respectively.

The council also awards certain other scholarships provided by other organisations.

In separate appendices, details are given of :—

The Research Council Act; Regulations Governing Bursaries; Studentships and Fellowships; Regulations Governing Foreign Travelling Scholarships; Scholarships held during the Year 1929-30; Scholarship Graduates; Regulations Governing the Awards of Grants for Research; Researches in Progress During 1929-30; Additional

Researches Completed in Previous Years; Publications of the National Research Council; Publications of the Canadian Engineering Standards Association; List of Papers Covering Researches Carried Out with Assistance from the National Research Council; List of Members of Associate Committees.

In conclusion, it may be added that the report can be taken as a model for the clarity with which the mass of information is set out.

W. A. P.

COMMONWEALTH OF AUSTRALIA. (1930). **Fourth Annual Report of the Council for Scientific and Industrial Research for the Year ended June 30th, 1930.** 51 pp. Canberra: H. J. Green. Govt. Printer. [f'cap.]

In this review, only those portions of the report relating to animal health are dealt with.

The Council has adopted the "policy of establishing Divisions, each under the control of an eminent authority in the sciences concerned, to direct the work in the capacity of Chief of the Division." The following six Divisions have so far been formed:—

(1) The Division of Plant Industry—Dr. B. T. DICKSON, Ph.D., &c. (Chief).

(2) The Division of Economic Entomology—Dr. R. J. TILLYARD, F.R.S., D.Sc., &c. (Chief).

(3) The Division of Animal Nutrition—Mr. H. R. MARSTON (Acting Chief).

(4) The Division of Animal Health—Dr. J. A. GILRUTH, D.V.Sc. (Acting Chief).

(5) The Division of Soils Research—Professor J. A. PRESCOTT, M.Sc. (Chief).

(6) The Division of Forest Products—Mr. I. H. BOAS, M.Sc. (Chief).

The total expenditure of the Council was £123,000. Except for about £18,000 this was all expended on investigations, certain items of which were:—animal diseases, £7,000; plant problems, £19,000; entomological problems (an item of capital expenditure was £24,000) £38,000, and animal nutrition, £13,000.

The Empire Marketing Board made a contribution of £29,000 to the funds.

The chairman of the Council is Sir G. A. JULIUS who took such a prominent part in the discussions of the Imperial Agricultural Research Conference held in London in 1927. Dr. A. C. D. RIVETT, the Chief Executive Officer, visited Europe last year on behalf of the Council. Mr. F. L. MCDOUGALL, Australia House, London, the Chairman of Imperial Agricultural Bureaux, represents the Council in Great Britain.

There are separate committees for each State and committees for certain special subjects such as:—poison plants, cattle tick dips, liaison committee, braxy-like disease investigations in Western Australia and meat preservation.

Section 6 of the report deals with Animal Health Problems.

FORMATION OF DIVISION OF ANIMAL HEALTH.—During the year, the work of the various investigations in progress was organised into a Division of the Council under Dr. GILRUTH.

In addition, seven veterinary officers and two chemists are employed at the Veterinary Research Institute, Melbourne University; the Pathological Laboratory, Adelaide Hospital; the Department of Agriculture, Western Australia; the University of Sydney and at the Nyngan Experimental Farm, New South Wales. One veterinary officer was engaged at the Rowett Institute, Aberdeen, in post-graduate work in animal nutrition.

Creation of the F. D. McMaster Animal Health Laboratory.—The laboratory is being built with £20,000 given by Mr. F. D. McMaster, of Dalkeith, Cassius, New South Wales. It is in the grounds of the University of Sydney.

"Black Disease of Sheep." (Infectious necrotic hepatitis).—The work described in the report by Turner [see this *Bulletin*. **1.** 35.] was done under the auspices of the committee.

"Braxy-Like Disease" in Western Australia.—A toxæmia produced by *B. welchii* is being investigated in coöperation with the Western Australian Department of Agriculture. Certain pasture and soil factors are considered to be concerned with the incidence of the disease.

Bovine Chronic Hæmaturia is dealt with at the Government Laboratory of Bacteriology and Pathology of the Adelaide Hospital and also under field conditions in the Mt. Gambier district, where the disease is probably more prevalent than in any other part of Australia. This has involved a study of the nutritional requirements of the dairy cow. "The results obtained during the year appear to have definitely excluded oxalic acid as being the irritant responsible for the production of lesions in the bladder."

Parasitological Problems.—Mr. Clunies Ross, the Veterinary Parasitologist to the Council, visited Japan to get special training in post-graduate research at the Japanese Institute for Infectious Diseases, Tokyo, under Prof. Miagawa. On his return he visited various research institutions in China and Java.

Caseous Lymphadenitis in Sheep.—A coöperative study along different lines has been made, including :—serological diagnosis, vaccination, methods of infection and dissemination [see this *Bulletin*. **1.** 32.].

Tuberculosis in Cattle.—Woodruff and Gregory are investigating BCG vaccine in Victoria and it is also being tested on a badly infected herd in Northern Australia.

Coöperation with Pastoralists Research Fund.—"At a conference between the Australian Wool Growers Council and the National Council of Wool Selling Brokers of Australia, held in Adelaide in June, 1927, it was unanimously decided to make a voluntary appeal for the payment of 2s. per bale on the then coming wool clip of Australia. The objective at the time was to establish a capital fund of £200,000, the income of which could be utilised in pastoral research. At the present time some £44,000 has been subscribed and the Australian Pastoral Research Trust Limited has been formed to administer the income obtained from the Fund.

"The Trustess of the Fund have indicated their willingness to coöperate with the Council in a programme of investigations relating to the health of sheep, and to allocate a sum of £2,000 per annum for five years for that purpose. The Empire Marketing Board has also agreed to contribute towards the cost of the work on a pound for pound basis with the Trust up to a maximum of £3,000 per annum for a period of five years.

"The investigations will accordingly be put in hand at an early date. They will probably relate to the drought feeding of sheep, certain aspects of the phosphorous deficiency problem, foot rot in sheep, certain aspects of black disease, urinary disease, infertility, and caseous lymphadenitis."

Beef Cattle Problems.—"Queensland and the north of Australia generally are responsible for practically the whole of the Australian export of beef and for many of the store cattle which are fattened in southern districts. Many pastoralists of the north have urged the Council to undertake research work into conditions which militate against the success of their operations. Dr. Gilruth, who is cognizant of many of these difficulties, visited Queensland last summer at the instance of the Council and furnished a comprehensive report with definite recommendations, which in essence met with the approval of the Council.

"Amongst the particular problems that are concerned the following might be mentioned : Breeding experiments with a view to the development—probably by crossing with Zebu breeds—of a special breed of cattle much more suitable for the northern coastal areas of Australia than existing breeds ; pleuro-pneumonia of cattle ; nutritional diseases generally ; cattle tick and redwater prevention ; internal parasites of cattle ; the so-called 'peg-leg' disease and several other unspecified and unstudied diseases which occur throughout Northern Australia and which cause losses from time to time.

"Dr. Gilruth's recommendations imply the coöperation of the Queensland Government, pastoralists and others, and the necessary negotiations to obtain that coöperation are now in progress. There is every reason to believe that the Empire Marketing Board will agree to the transfer to the scheme of its original offer of very considerable contributions towards an Australian Tropical Agricultural Research Station."

ANIMAL NUTRITION.—The death of Dr. BRAILSFORD ROBERTSON was a great loss to the Division. The investigation of problems associated with the economic possibilities of increasing the wool clip by supplementary feeding with cystine-rich materials has been extended.

The changes caused by heavy stocking on the botanical composition of grazed land and the resultant influence on the wool clip and growth of the sheep is being studied at Glen Elgin, New South Wales.

Drought feeding is receiving attention. Further work has shown that, in the areas which have so far been dealt with, there is little or no iodine deficiency in Australian pastoral country. Phosphate deficiency is very important; this is caused, rather by the high calcium content than by the low percentage of phosphorus in the fodder plants.

Mineral deficiency in pastures is studied as a coöperative enterprise by the Empire Marketing Board, the University of Adelaide and by the Council. The Council's investigations are carried out at the Melrose Laboratory of the Waite Agricultural Research Institute under Prof. A. E. V. RICHARDSON.

ENTOMOLOGICAL INVESTIGATION.—The effects of three species of *Chrysomela* on St. John's Wort (*Hypericum perforatum var. angustifolium*) [see this *Bulletin*. **1.** 71.] and also of the cinnabar moth (*Tyria jacobææ*) on ragwort (*Senecio jacobææ*) [see this *Bulletin*. **1.** 71.] have been tested.

The "buffalo-fly" (*Lyperosia exigua*) pest [see this *Bulletin*. **1.** 296.] and the sheep "blow-fly" pests—*Lucilia sericata* (greenbottle fly), *Chrysomyia rufifercies* ("hairy maggot fly") [see this *Bulletin*. **1.** 65.] are given considerable attention.

COLD STORAGE PROBLEMS.—The Meat Preservation Committee is responsible for investigations into meat problems.

PUBLICATIONS.—Apart from the *Journal of the Council for Scientific & Industrial Research* and the valuable *Catalogue of Scientific Periodicals in Australian Libraries*, separate pamphlets dealing with work of the Divisions of Economic Botany, Economic Entomology, Animal Nutrition and Mineral Content of Pastures have been issued.

W. A. P.

—. (1931). **Report of the General Meeting of the Australian Veterinary Association, held at the Veterinary School, Melbourne University, May 25th, 1931.**—*Austral. Vet. J.* **7.** 107-117.

Dr. H. R. SEDDON was the retiring President and Dr. J. A. GILRUTH was elected to the office for the ensuing year. The Education Committee and, subsequently, the Council considered the length of the existing course of study for a veterinary degree in Australia; the teaching of practical veterinary work in veterinary schools; the need for students to gain experience of practical work during vacations; the need for a post-graduate diploma course in hygiene; the conditions for honours on graduation; the degree of D.V.Sc. and the degree of B.Sc.

In view of the amount of material available and for other reasons, it was decided that, in the future, six issues of the *Australian Veterinary Journal* will be produced annually, if possible, instead of four.

Dr. SEDDON gave his presidential address and papers were contributed by FILMER (Piroplasmosis in Western Australia); by MCLENNAN (A Disease of Lambs); by GUNN (Horn Grafting in Horses); by BORDEAUX (Diathermy); by FETHERS (Calcium chloride in the treatment of Milk Fever); by KAUZAL (The Diagnostic Value of the Ova and Larvæ of some common Nematodes of Sheep); by HUTCHISON (Some Experiments on Avitaminosis); by SEDDON, BELSCHNER & MULHEARN (The Susceptibility of Sheep to Sheep Blowfly and the Influence of Breeding on this); by MURNANE (*Sarcostemma australe*—" Caustic Vine "—proved Poisonous to Sheep); by ALBISTON (Poultry Plague); by BELSCHNER & EDGAR (Infectious Nasal Catarrh of Sheep); by HINDMARSH & EDGAR (Observations on *B. suipestifer*–septicæmia of Pigs) and by HINDMARSH & EDGAR (Pyæmic Hepatitis in Sheep). [Most of these papers will be dealt with separately in this *Bulletin*.]

The Council of the Association discussed, among other matters, the " buffalo fly " (*Lyperosia exigua*) problem and passed a resolution that the attention of the Commonwealth and State Governments be drawn to the grave menace to the cattle industry of Australia involved by the continued eastward spread of the fly.

Dr. SEDDON presented his report as the Association's delegate to the International Veterinary Congress. The Council passed the following resolution :—

" That it be a recommendation to the next General Meeting that it endorse the following recommendation contained in a report by Dr. H. R. Seddon on his impressions of the International Veterinary Congress : ' That an endeavour be made to have the following subjects given more prominence at future international and imperial veterinary congresses, (a) diseases of sheep; (b) animal nutrition; (c) animal genetics; (d) plants poisonous to stock.' And that the recommendation of the General Meeting be transmitted to the Secretary of the International Veterinary Congress, the National Veterinary Medical Association and the Imperial Bureau of Animal Health."

IMPERIAL BUREAU OF ANIMAL HEALTH.—" After discussion it was moved by Dr. Bull, seconded by Col. Whitfield : ' That the A.V.A. is pleased to know that following resolutions at the Imperial Agricultural Conference, all parts of the British Empire are contributing funds towards the establishment and upkeep of several bureaux, the main function of these bureaux being to supply information to all inquiries from all parts of the Empire.

" ' In connection with animal health, action has been taken to publish a veterinary bulletin which will contain abstracts of all work done in the field of animal health. This is a most important and essential step in the direction of assisting workers in this field.

" ' It is strongly recommended that nothing should be allowed to interfere with Australia's contribution to the funds necessary to maintain these bureaux, and especially that of the Animal Health Bureau.

" ' It is obvious that the work of the Bureau will very materially economise time of workers, and will prevent time and money being spent on work that has already been confirmed in other parts of the world.' Carried."

POULTRY INDUSTRY IN AUSTRALIA.—" It was moved by Dr. Bull and seconded by Col. Whitfield : ' That in view of the importance of the poultry industry to Australia, and of the increase in the extent of poultry disease in recent years, that this General Meeting of the A.V.A. recommends the provision in all veterinary services of a veterinary pathologist to undertake investigational work into poultry diseases, and also a field and extension officer (veterinary) to assist in the application of knowledge in the field to the poultry industry.' Carried."

W. A. P.

NEW ZEALAND. (1931). **Wallaceville Veterinary Laboratory.** (HOPKIRK, C. S. M.). *Annual Report, New Zealand Department of Agriculture for 1930-31.* pp. 51-53. Wellington : W. A. G. Skinner, Govt. Printer. [1s. 3d.] [f'cap.]

The Staff and accommodation have been increased during the last year or two. Mr. GILL returned from his long tour of institutions in North America,

Europe, South Africa and Australia, in the course of which he had made contact between the Wallaceville laboratory and the workers on various cognate subjects in the different countries.

Considerable use has been made of the distant laboratory accommodation, in the form of a permanent diagnostic laboratory at Hamilton, for material from the Auckland Province, and the room in New Plymouth for the assistance of those officers engaged on special investigational duties in Taranaki, mentioned in the report of the previous year. The work involved in the examination of routine specimens is heavy :—5,550 specimens at Hamilton, 736 at New Plymouth and 5,720 at Wallaceville.

Cattle Diseases.

Sterility in Dairy Cows.—Investigations have shown that a streptococcic infection of the genital organs in bulls is frequently responsible for apparent sterility in the cows. A similar infection of the cervix in cows was also encountered and studied. Factors relating to the genital organs in both sexes which influence the longevity of spermatozoa were dealt with.

Abortion in Dairy Cows.—Methods of immunisation and various factors relating to bovine abortion and also to human undulant fever were investigated.

Other Diseases.—Streptococcic mastitis, Johne's disease, milk-fever of cows and " parturient eclampsia " of cows were studied. A considerable amount of material from cases clinically diagnosed as " blackleg " was examined. The majority of the cases were attributable to *B. chauvœi*, but *V. septique* was responsible for some.

Sheep Diseases.

Caseous Lymphadenitis.—Considerable attention was devoted to this disease. Methods of infection were studied, e.g. ingestion, congenital infection and trauma. Spraying with a liquid dip immediately after shearing did not prevent infection when cuts of an overlapping nature were made with infected shears in the course of clipping. Surgical and also chemo-therapeutic treatment were given attention ; potassium iodide and mercuric iodide treatment did not have any effect upon pre-existing abscesses. Attempts to elaborate a serological test have not yielded satisfactory results. Comparable suppurative conditions were sometimes due to mixed infections, with or without *B. pyogenes*.

" Pulpy Kidney Disease."—" The season's work ruled out the theory that cholesterol in the blood stream might be responsible for the trouble. The main work centred round an effort to establish the presence or absence of abnormal toxins in the small gut of affected lambs. It was greatly hampered by the small number of suitable cases for working on that occurred this year. Nevertheless what was accomplished pointed strongly to the presence of such toxins in the gut, and their inoculation into healthy lambs produced a condition that was indistinguishable from the naturally occurring disease. It is felt that this has given a more definite clue than we have previously had, though there is still a very long way to go. Further biochemical and histological examinations confirmed the previous findings.

" A further large series of ewe-milk analyses were arranged for, and these showed that yarding for 24 hours, which is the only method which so far has been shown to check the losses, reduces the ewes milk-yield temporarily by about 50 per cent. Very few samples from ewes whose lambs died were obtainable, but such as were analysed showed that such ewes tend to give a greater amount of milk than the control normals and of slightly richer quality."

" Circling Disease."—[See Gill, this *Bulletin*. **1.** 89.].

Epizootic Jaundice.—[This is apparently the same disease as " yellows " or " yellowsis " seen in Scotland, " headles " seen in Northern Ireland and " geeldikkop " seen in South Africa]. The work in New Zealand supports the view, which is also held elsewhere, that an agent producing photosensitisation

may be the cause or that, on the other hand, the disease may be related to chemical imbalance of the diet. There was always excess of clover on the land where the disease occurred.

"Biochemical analysis of blood gives a picture of fairly high calcium, low phosphate, leucocytosis, and hæmolysis, suggestive of a hæmolytic bacterial invasion. Histology reveals in the liver the large phagocytic cells spoken of by De Koch."

THE EFFECT OF FEEDING SHEEP ON ERGOT.—For long intervals sheep were fed with relatively large amounts of ergot obtained as screenings from the season's grass seed, mainly rye. No specific evidence of typical ergot poisoning was produced, although two of the sheep died in the course of the work. The experiments were carried out to see whether ergot produced :—

(a) Deformed lambs as seen frequently on fescue in Otago.

(b) Nervous symptoms seen in dry seasons on bare paddocks in certain North Island centres. The sheep were fed on hay only, to try as nearly as possible to simulate the conditions seen where rye-grass staggers occurs.

ARTHRITIS IN LAMBS.—"In view of the close relationship of the organism causing arthritis in sheep in New Zealand with that of swine erysipelas, an attempt was made with work on mice and pigs to find whether the strains were identical or whether the arthritis strain might prove dangerous to pigs.

"The effect on mice of the two strains was found to be identical, and typical of swine erysipelas. Pigs inoculated, subcutaneously with cultures of organisms of arthritis and swine erysipelas which had had virulence raised by mice passage, did not react in any way, and were found to be quite free at *post-mortem* examination from lesions of any description."

COCCIDIOSIS was diagnosed in sheep for the first time in New Zealand.

"The lesions appeared as small pedunculated tumours attached to the mucosa of the intestine."

DEFICIENCY CONDITIONS IN SHEEP.—"(a) *Morton Mains*. Blood specimens from this area have shown that there is a deficiency of calcium, phosphate, and magnesium in the blood. The shortage of phosphate and magnesium may very well be the result of the anæmic condition of the animals, but the lowered calcium is rather suggestive of a deficient intake of that mineral, more especially as bones, from their brittle and thin appearance, are also deficient. Analyses of bones are at present under way.

"(b) *Te Pohui*. Investigation showed nothing in the way of lime and phosphate deficiency, but tended to point to iron deficiency."

Ante-partum PARALYSIS was given considerable attention.

POULTRY DISEASES.

COCCIDIOSIS of pullets, four to eight months old, was observed—a condition of comparatively recent occurrence in New Zealand.

BLEEDING, the disease discussed in the previous report as hæmangioma, was again studied. It occurs in a number of flocks in the South Island and there is a suspicion that it is hereditary.

BIOCHEMICAL WORK.

A considerable amount of work was undertaken to ascertain the normal values or limits of certain constituents of the blood and urine of normal sheep. The following observations were made :—

NORMAL LIMITS FOR BLOOD (VALUES IN MILLEGRAMMES PER 100 C.C.).

	Sheep.	Dogs.	Cattle.
Calcium	10-11·5	10·5-11·5	10-11·5
Inorganic phosphate ...	4·5-5·5	—	4·5-5·5
Magnesium	1·5-2·5	2·5	—
Potassium	17-26	20-25	—
T.N.P.N.	28-38	30-35	28-38
Urea N.	14-20	12-17	12-17
Creatinine	1-2	1-2	1-2
Amino acid N. ...	5-8	—	—
Uric acid	2·5-3·5	2·5	—
Chlorides	450-550	—	450-500
Sugar	0·050-0·065%	0·060%	0·050-0·060%
Cholesterol	90-110	—	90-130
Hb	70-80%	85-95%	Approx. 60%
Erythrocytes	10-11 mils per c.mm.	5½-6½ mils.	7½-8½ mils.
Leucocytes	6,000-8,000	8,000-12,000	5,000-7,000
Polymorphs	Approx. 30%	Approx. 60%	Approx. 35%
Lymphocytes	,, 65·5%	,, 37%	,, 58%
Eosinophils	,, 4%	,, 3%	,, 7%
Basophils	,, 0·5%	—	—

URINE ANALYSES.

	Sheep.	Cattle.
Sp. G.	1,010-1,030	1,010-1,030
pH	Approx. 7·5	Approx. 7·5
Albumen	Nil.	Nil.
Sugar	,,	,,
Acetone	,,	,,
Diacetic acid	,,	,,
Urobilin	,,	,,
Urea	Approx. 2·0%	Approx. 2·0%
Ammonia nitrogen	4·20 mgm. per 100 c.c.	—
Total nitrogen	1,000-1,500	1,000-1,500

W. A. P.

JAMAICA. (1931). **Report of the Government Veterinary Surgeon.** [LOCKETT S.] *Ann. Rep. Dept. Agric., Jamaica, B.W.I., for the Year ended Dec. 31st, 1931.* Kingston. Govt. Printing Office. pp. 11-14. [f'cap.]

The report is divided into nine sections :—Government Farm School, Hope ; Government Stock Farm, Hope ; Government Stud Farm, Grove Place, Manchester ; Diseases under the Contagious Diseases of Animals (Inland) Law ; Tick control ; Departmental Assistance ; Assistance in Education ; Inspections of Exported and Imported Animals and the Protection from Diseases (Bees) Law, 1918.

The government veterinary surgeon delivers lectures to each of the three years classes at the Government Farm School, Hope ; details of the curriculum are given.

In January, 1927, a tuberculin test showed that 5·56 per cent. of the cattle-strength, varying from 297-359 head, at the Government Stock Farm, Hope, were infected with tuberculosis ; in the course of annual tests which have been carried out since November, 1928, one reactor was detected in 1928 and one in 1929 ; there were no reactors in the 1930 test.

B. bigemina infection causes a good deal of trouble. The cattle are dipped twice weekly throughout the year, but there is always some danger of light tick

infestation as outside, undipped cattle sometimes break in and the farm cattle sometimes break out into infested land.

The stock are vaccinated with black-quarter aggressin annually as the disease has, on occasion, caused heavy mortality. There were odd abortions and retentions of the placenta ; [it would be of interest to know if *Br. abortus* infection is present.]

Tuberculosis has been controlled in the farm poultry by means of testing ; annual animal vaccination with fowl cholera aggressin is carried out as this disease has caused losses in the past.

Dipping of the cattle is carried out, similarly, at the Government Stud Farm, Grove Place, Manchester. Tuberculin tests carried out in 1924, 1927 and 1930 failed to reveal any reactors.

There were no outbreaks of serious contagious disease, but a careful watch is always maintained and all suspicious reports are immediately investigated.

" No general inspection of cattle or dipping tanks was done during the year. Judging, however, from the sales of Paranaph and Arsenite of Soda to owners of registered tanks, from the Government Laboratory, it is safe to say that dipping is being practised on many of the cattle properties."

There are now 341 registered tanks.

W. A. P.

REVIEWS.

PROWAZEK, S. S. von & NÖLLER, W. (1931). Handbuch der Pathogenen Protozoen. Lieferung. **13.** pp. 1,969-2,171 : Die nächsten Verwandten der Blutflagellaten und ihre Beziehungen zu den blutbewohnenden Formen. [**Handbook of Pathogenic Protozoa. Part 13. Protozoa most closely related to the Blood Flagellates and their Relationship to the Types living in Blood.**] By Prof. W. Nöller [Director of the Parasitology Institute of the Veterinary College, Berlin.] 28 text figures. Leipzig: Johann Ambrosius Barth. [RM 32 unbound.] [4vo.]

This is the final part of von Prowazek's well known " Handbuch der Pathogenen Protozoen " and is written by Professor NÖLLER.

In view of the lack of unanimity concerning the classification of protozoa, the author has used his own method. In this book he deals with the material under five headings :—(1) intestinal forms occasionally present in blood [*Tetramitidæ* and *Hexamitidæ*] ; (2) blood-invading *Bodonidæ* ; (3) blood-invading *Herpetomonadidæ* ; (4) transition types of *Herpetomonadidæ* without an undulating membrane form, and (5) types of *Herpetomonadidæ* in which an undulating membrane is always present. The last type includes crithidia and trypanosomes. The most important section from the veterinary viewpoint, that on trypanosomes, is dealt with concisely both under the headings of hosts and of vectors and useful charts are provided which show these relationships at a glance.

There are 41 pages of references at the end of the text as well as quotations in the subject. An index to the entire " Handbuch der Pathogenen Protozoen " is published at the end of this last volume. The printing is up to the best standard.

J. T. E.